

# MINING CONGRESS JOURNAL



OFFICIAL

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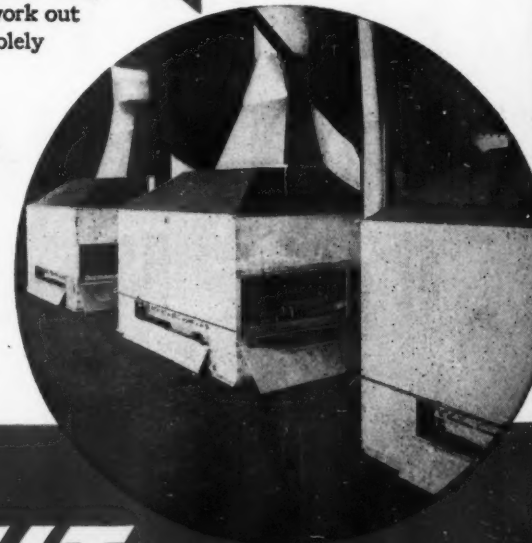
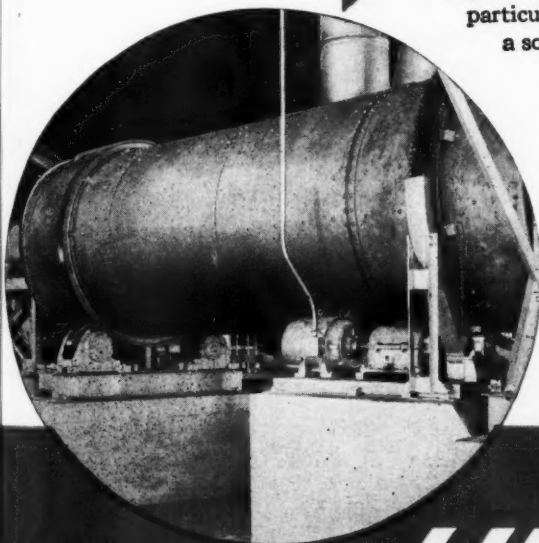
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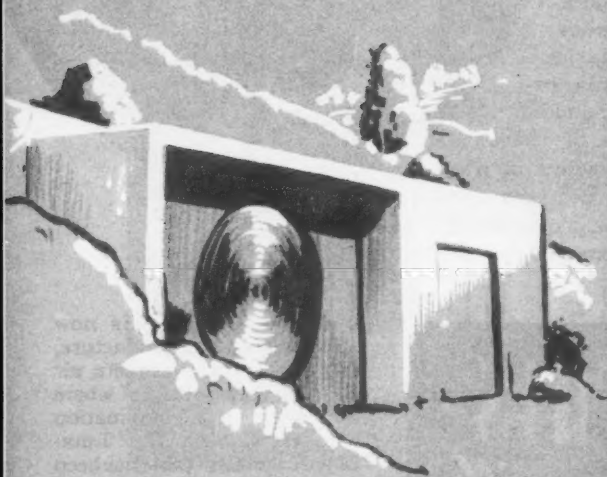
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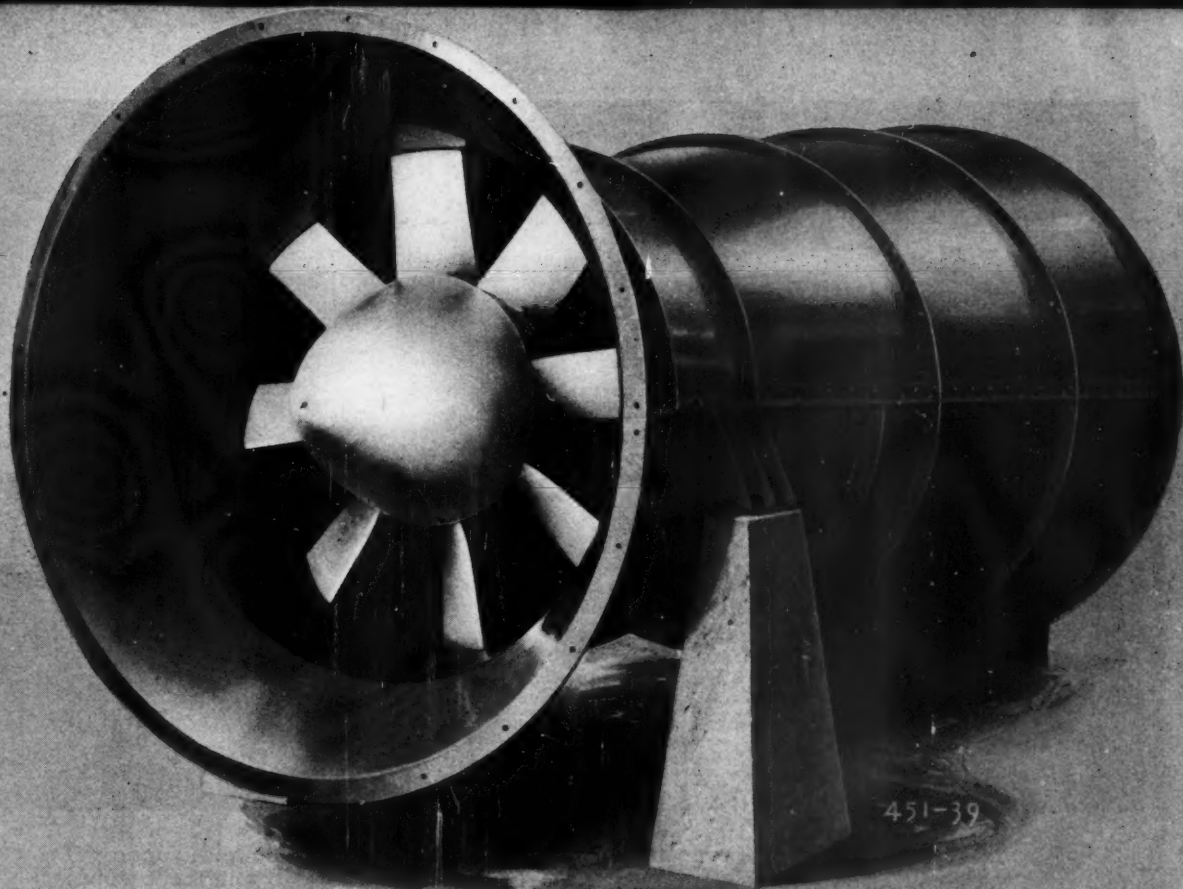


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Bulletin No. 719

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STANDARDS AS GOVERN  
ORIGINAL EQUIPMENT**

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Three years' operation at this 100% O-B Coupler installation\* disclosed these significant results:

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**2 IN FASTER LOADING!** The use of O-B couplers speeded up loading machine operation materially. Although no definite calculations were made as to the actual time saved in serving mechanical loading machines, it was the opinion of all officials interviewed that the use of O-B couplers stepped up this portion of the operation to a considerable extent.

**3 IN HIGH SPEED HAULAGE!** It was found that the rigid beam connection and the smoother operation of cars in transit permitted higher haulage speeds with reduced coal spillage and chance of derailment.

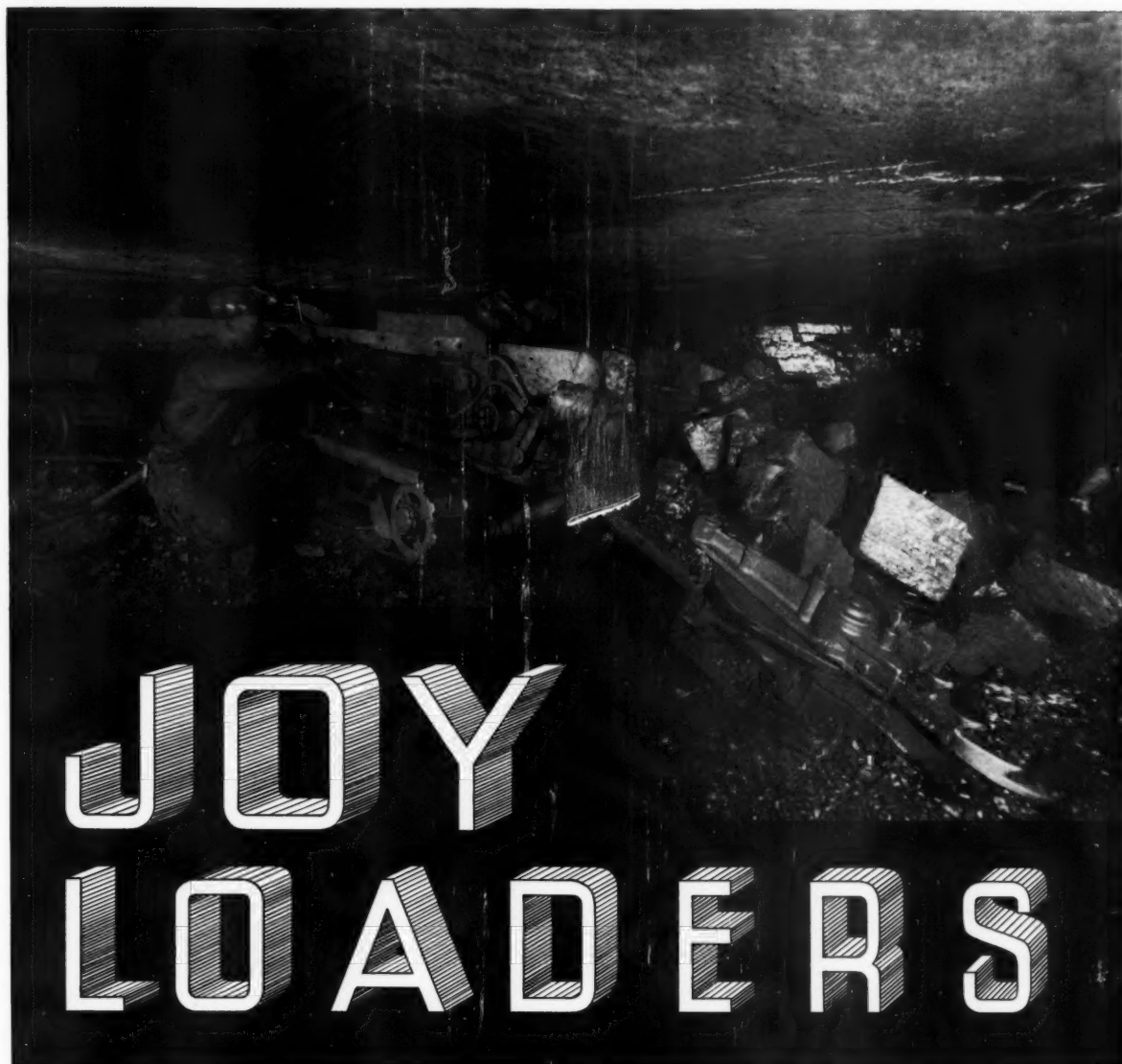
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AMERICAN CYANAMID COMPANY  
RESEARCH LABORATORIES

# BEHIND THESE DOORS



So valuable has microscopy become that today every ore sample submitted to the Cyanamid Ore Dressing Laboratory is sent first to the Microscopical Division for examination, study and report. With this information Cyanamid Ore Dressing Engineers can then attack problems with the greatest possible efficiency. Often, microscopical examination of samples from a new ore body shows values that cannot be recovered economically or satisfactorily by conventional methods . . . in which case the organic, physical and colloid chemists of the Research Division are called in to help solve the problem.

Cyanamid Ore Dressing activities are not, however, limited to the solution of problems arising out of the development of new ore bodies. Operating concentrators are continually presenting their metallurgical problems for check-up. Often unsuspected changes in the character of the ore as revealed by the microscope necessitate revision of the existing flow scheme. Just as frequently examination shows no possibility of improving present recovery, confirmation of a job well done in a far-away mill.

Sensing the future importance of microscopy as the foundation of good metallurgy, the Cyanamid Ore Dressing Laboratory has for years been adding to its specialized personnel and improving its equipment for this intricate work.

AMERICAN CYANAMID COMPANY

# MICROSCOPY IS ROUTINE!

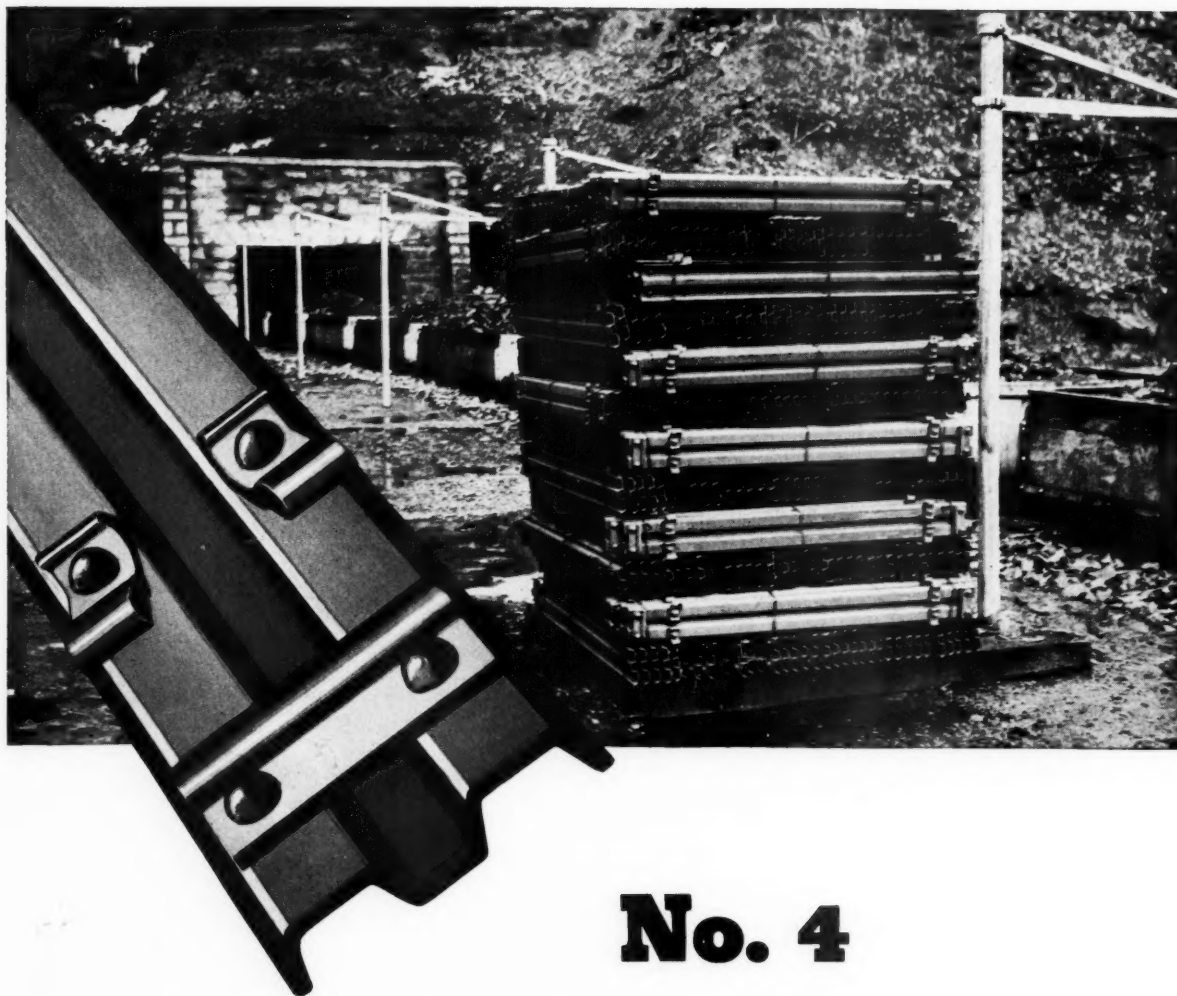


Today the Microscopical Division has experts in the art of polishing specimens to a standard deemed impossible a decade ago. Here are specialists in micropetrography and mineralography . . . to interpret what the microscope reveals and by their diagnosis to point the way to improved metallurgy. Here, too, are facilities that include the finest microscopes, equipped with the latest accessories, such as the universal stage and the integrating stage. Here, also, is such associated equipment as the Infracizer, Superpanner and the ultra-violet spectroscope.

Just as the small community must rely upon the services of a general practitioner because the population cannot economically justify the specialists and specialized equipment of a great Medical Center, few mills have the volume of test work to warrant laboratory personnel and facilities found in the Cyanamid Ore Dressing Laboratory.

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No. 4 is not intended to replace either No. 2 or No. 3,

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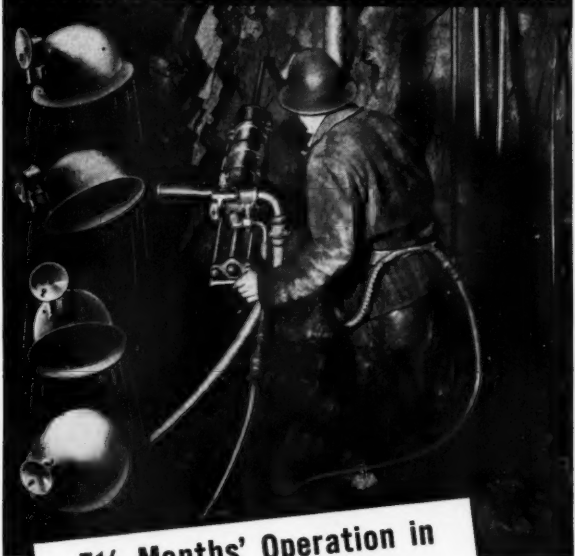
For prices and further information call the nearest Bethlehem district office, or write Bethlehem Steel Company, Bethlehem, Pa.

**BETHLEHEM STEEL COMPANY**





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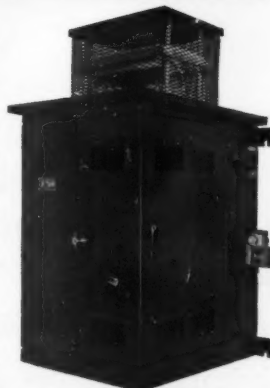
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*Opinions expressed by authors within these pages are their own, and do not necessarily represent those of the American Mining Congress*

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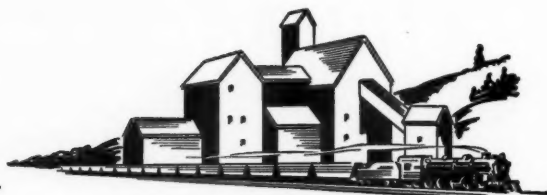
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## Business Depressions

**WE ARE** entering the eleventh year of the great depression. No other depression in our history has lasted half so long. An examination of the reasons may be profitable.

The usual cause of business depressions is a universal and radical fall in price levels in a world of excessive financial liabilities; securities pledged to protect loans so depreciate in value as to wipe out equities; speculators sell wildly on a falling market. When these conditions prevail in the securities market we call it a Wall Street panic. When falling prices prevail in all commodities, when there is no field in which investment can be made with safety to capital, when all progress stops and money goes into hiding to stay until there is some assurance that the bottom of price levels has been reached, we call it a business depression. The drowning man must sink to the bottom before his feet reach any substantial base from which to push to the surface.

When prices are at a level which indicates that liquidation has run its course, investment begins. The investor feels that price levels can go no lower, and since they cannot long remain constant they must go higher.

The investor's money is worthless to him until invested. At the lowest market levels he cannot lose, and eventually is sure to win. The investor is always anxious to get in the market before the prices go higher, and the stampede to unload has turned into a steadily rising demand to buy, which means the end of business depression. Every investment made raises price levels.

This has been the rule in all previous business depressions—1837, 1857, 1873, 1893—all of which were proportionately more severe than 1929 and none of which lasted one-half so long. Why? Because the law of supply and demand had its ways in the earlier depressions, and a governmental control has sought to displace this universal rule in our present depression.

If we look abroad we find that our world-wide 1929 depression has been routed in all countries except those where governmental-managed economies have prevailed—namely, France and the United States. The League of Nations points out that 20 of the 22 world countries recovered from the same business panic long ago, and that France and the United States are the only nations in the world that are still struggling with adverse conditions.

To say that we are on a sound basis while we have several million unemployed men—while we are spending millions for relief—is ridiculous.

To borrow money to spend for anything to be consumed is most dangerous, and only sheer starvation can justify such procedure. This is eating the seed for next year's harvest—killing the goose which lays the golden egg—killing the cow which manufactures grass into milk and butter; and all this we have done in a frantic effort to find a substitute for natural laws.

If the experiences of the past had been considered we would have saved ten or fifteen billions of dollars which we now owe—and would now be in the high tide of prosperity. Five million men who now look to Government for support would have been independent, self-respecting citizens instead of being "licked." They would be ready to fight any and all obstacles, and our Stars and Stripes would mean to them liberty and independence.

It was a wise statesman who said: "I know of no light by which my feet may be guided except the lamp of experience."

*J. H. Cleeve*

# MINING CONGRESS JOURNAL

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Richard J. Lund, Editor

## A REMARKABLE SAFETY RECORD

OF all important events in the mineral industry during 1939, the feature that stands head and shoulders above all else is the remarkable safety record established during that year. Even though the unfortunate Bartley disaster followed so soon after, the record is one of which the mining industry may well be proud. In coal mining, for instance, preliminary figures indicate that the best safety record in the statistical history of the industry was hung up. Fatalities in the production of the nation's 440,000,000 tons of coal (bituminous and anthracite) were less than one-half the yearly average for the period of 25 years from 1906 to 1930, inclusive, giving an all-time low fatality rate of 2.52 per million tons of coal produced. The rate for the bituminous coal industry was 2.28 per million tons, based on an estimated production of 389,700,000 tons, while anthracite showed a higher rate of 4.32, based on an estimated output of 50,000,000 tons.

Notable records are known to have been made in the mines of several states. Of particular interest is the record of the northern West Virginia field, where mechanization has recently made rapid strides. In 1935 this field showed a record of more than 66,000 man days per fatal accident, while in 1938 this figure had increased to more than 76,000. The tons per man day record in 1935 was 4.84, while in 1938 it was 5.19, showing that the increase in man days per fatal accident has been approximately twice as much as the increase in tons per man day.

Records of individual producers will not be available until later in the year when various safety surveys are made and trophies awarded. However, it is quite probable that mines of the Union Pacific Coal Company, where such outstanding safety records have been scored in past years, will be well up in the running. Recent figures posted by Union Pacific are particularly noteworthy, since they reveal outstanding increases in man-hours per accident, while the percentage of coal loaded mechanically rose from 16 to 100 percent. Here is their enviable record:

Period	Percentage Coal Loaded Mechanically	Man-Hours Per Accident
1923-1927	15.61	15,617
1928-1932	63.18	16,329
1933-1937	97.18	61,165
Year 1938	100.00	103,172

In metal mining, even rough approximations of the 1939 accident rate cannot be made at this early date. However, no major fire or explosion disasters occurred, and a number of excellent local records are worthy of note. Iron mines in Gogebic County, Michigan, for instance, operated the fiscal year October 1, 1938, to September 30, 1939, with but one fatal accident in producing 2,780,943 tons of ore—by far the best showing ever recorded during the history of the district. Out in Butte, Mont., 150 crews of Anaconda Copper Mining Company worked 153,098 shifts during October, November and December without a single lost-time accident.

All these examples cited didn't "just happen"—they are the reflection of the combined efforts of employers, employes and state and Federal agencies, all working zealously toward improved safety in mining. Occurrence of the Bartley explosion on January 10, taking a toll of 91 lives, in a mine where every conceivable precaution had been taken by the management to prevent just such an event, and where an enviable safety record had been scored for years previous as well as in other mines of the company, merely emphasizes the task still before the industry. Indeed, it may indicate that, under the best of safety techniques, the inherent hazards of mining still remain in some degree.

The outstanding progress in the field of mine safety has in large degree been made possible by the leadership of the United States Bureau of Mines and the confidence reposed in it by mining men throughout the nation. The basic principle underlying this effective work has been voluntary cooperation.

The coal mining industry is now faced with the threat of compulsory Federal inspection of its mines—the Neely Bill having already passed the Senate and now awaiting consideration by the House Committee on Mines and Mining. It is highly doubtful if passage of this Act would bring about improved safety conditions—it would merely result in unnecessary duplication of effort and expense by Federal and State agencies concerned with mine safety, and endanger continuance of the fine spirit of cooperation under which such excellent progress has been made. Moreover, it would be just one more step in the march toward a dictatorial central government, in outright violation of the rights of the states to govern their local affairs in the manner best suited to the special conditions prevailing.

The debate on this measure in the Senate revealed a sorry lack of knowledge as to pertinent facts—or perhaps it reflected a strong tendency to side-step them, since industry has certainly made its voice known in this regard. It is greatly to be hoped that the House Committee will go over the Act and its implications with a fine tooth comb, and not be stampeded into hasty action that may result in jeopardizing further progress in the splendid safety record scored in recent years.



Eagle-Picher Mining and Smelting Company's Central Mill in the Tri-State District is now treating 10,000 tons daily with aid of differential density cone process

## Concentrating Tri-State Ores by DIFFERENTIAL DENSITY CONE

IN THE early thirties C. Erb Wuensch offered to the operators of the Tri-State district a new method of concentrating their lead and zinc ores. He had built in his laboratory at Waco, Mo., a model of this process in which he would treat their ores at the rate of approximately one ton per hour and make an efficient concentration of the minerals.

### Successful Operation in World's Largest Zinc Mill

Although Wuensch's plant was an intricate assortment of laboratory equipment, embodying many new mechanical ideas, the honor goes to him as the one person to introduce to the Tri-State district the basic principle of a new concentrating process around which the flow sheet of the world's largest zinc mill, the Eagle-Picher Mining and Smelting Company's Central mill, has been rebuilt and is now operating successfully at a capacity of 10,000 tons daily.

It has been said that the road of progress is usually rough. The fact that Mr. Wuensch's idea was born at a time when the price of zinc was at an all-time low, caused his process to travel over an exceedingly rough path,

● ***New Process Introduced in Tri-State by Wuensch Now Proving Commercial Success at Eagle-Picher's Central Mill, Largest Zinc Concentrator in the World, Treating 10,000 Tons Per Day. Will Play No Small Part in Prolonging Life of District.***

By ELMER ISERN

Chief Metallurgist and General Mill Superintendent  
Eagle-Picher Mining and Smelting Company

and it took foresight, ingenuity and patience of a number of others to bring this process out of the laboratory stage to a commercial basis.

This is the basic principle of his process, and with it go many problems, such as:

1. Recovery of the lead media.
2. Cleaning of the lead media from fine gangue.
3. Cleaning of the ores from slimes and fine gangue.
4. Controlling the grain size, settling rate and viscosity of the media.
5. The necessity of having a simple flow sheet for commercial operation.



MINING CONGRESS JOURNAL



The plant as designed by the contractor was completed and put into operation in March, 1938. It ran spasmodically and with varying success in a practical way until November of the same year, when it was closed down.

On January 6, 1939, G. C. Niday, general manager of Tri-State mines for the Eagle-Picher Company, instructed his organization to make a test run of three days for the purpose of gathering data, via samples, on the various phases of the circuit. This was done, and a new flow sheet was proposed.

This phase of the work must be credited to Victor Rakowsky and his co-workers prominent among whom was Charles Hebbard. Mr. Rakowsky's efforts finally led him to Howard Young, of the American Zinc Company, who became interested enough to build an experimental plant in their mill at Mascot, Tenn.

#### Commercial Plant Built

In 1937 George Potter, vice president and general manager of the Eagle-Picher Mining and Smelting Company, made the bold decision to build a commercial-sized plant at the Central mill near Picher, Okla., embodying this new ore-concentrating process. With the aid of Mr. Rakowsky, this plant was designed and built by the Roberts and Schaefer Company.

The ores of the Tri-State district consist principally of galena (lead sulphide) and sphalerite (zinc sulphide) in a silicate gangue of chert or flint. Since these minerals and gangue of the ore are of various gravities (galena 7.5, sphalerite 4.0 and gangue from 2.6 to 2.65), and the minerals are found in a low degree of dissemination, the greater portion of the minerals have been concentrated economically, and quite efficiently, by the gravity process known as jigging, which depends upon a pulsating current of water being passed upward through a bed of deslimed ore, ground to approximately minus 1/2-in. mesh, thereby causing the heavy minerals to sink to the bottom of the bed and be drawn off.

The efficiency of jigging is tested in the laboratory by placing a sample of this ore in a solution of acetylene tetra-bromide, which has a high specific gravity. At a gravity of approximately 2.68, a grade of concentrates, sufficiently rich to warrant re-treatment by flotation, can be made, with an added recovery of 7 to 15 pounds of zinc blende per ton of ore treated.

+ + +

The differential-density cone process being used by the Eagle-Picher Mining and Smelting Company at the Central mill and by the American Zinc Company of Tennessee at their Mascot, Tenn., operations, is now treating at the rate of approximately 3,500,000 to 4,000,000 tons of zinc ores annually. The entire tonnages of both properties are being handled by this process.

The process, as applied to ores, was first put to commercial use by the American Zinc, Lead and Smelting Company at Mascot, and later licensed to the Eagle-Picher Mining and Smelting Company in the Tri-State district of Oklahoma, Kansas and Missouri.

American Zinc, Lead and Smelting Company exclusively controls the licensing of this process in the United States, Mexico and Canada for all types of ores and coal.

+ + +

#### Galena Used for Media

Since the chemical acetylene tetra-bromide is extremely expensive and difficult to recover, Mr. Wuensch has attempted to use finely ground galena in water to make a media which would give the same gravity and viscosity characteristics as obtained by the use of an acetylene tetra-bromide solution.

The circuit was installed and the plant started February 28, 1939, and has been operating continuously ever since. This entire shift has been made without the curtailment of production. In fact, the capacity of the mill has almost been doubled.

Needless to say that operations were carried on at times under quite a handicap, but, in general, the solution to the above mentioned requirements have been found, and today Mr. Wuensch's pet idea is truly a commercial success, the economics of which will play no small part in prolonging the life of the tri-state mining field.

#### Flow Sheet Detailed

The flow sheet of the Central mill of today is as follows:

The ore from the mines is transported by truck and train to the receiving hoppers at the mill, after which it is crushed by two 36-in. Webb City jaw-crushers, to pass approximately 6-in. mesh. Prior to dumping the ore, it is weighed, and, while being conveyed from the crushers to the 6,000-ton storage hopper, it is sampled. From here the ore is fed by five belt feeders onto a collecting conveyor belt and conveyed to a



C. ERB WUENSCH

distributing hopper at the head of the secondary crushing plant. Here the ore is fed by belt feeders onto four 5 x 10-ft. Tyler vibrating screens in parallel, equipped with 1 1/2-in. mesh screen cloth. The plus 1 1/2-in. material is collected from these screens and conveyed to a 7 1/2-ft. Symons lowhead crusher, where it is crushed and conveyed back to the distributing hopper.

#### Washing Facilitates Screening and Minimizes Slimes

Ore is washed with a heavy spray of water as it comes on the 1 1/2-in. screens, and the undersize is flumed to 6 x 12-ft. Robins screens directly underneath, which are equipped with 3/16-in. x 1/2-in. woven wire cloth. Here again the ore is washed with a heavy spray of water, in order to facilitate screening, and also clear off

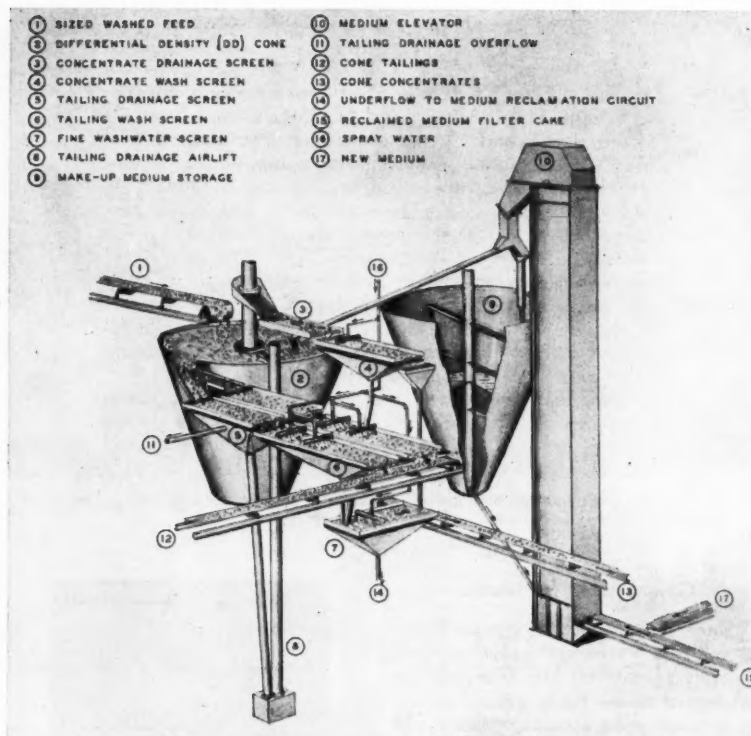


Fig. 1. Sketch illustrating various phases of the separating unit or cone plant

as much as possible all of the slimes from the ore.

Undersize of these screens is flumed to two 30-in. elevators, where it is delivered over an "oversize-catching" screen, thence into two large belt drags. The drag discharge, or dewatered 3/16-in. undersize, is conveyed to the jig mill storage hopper, where it is distributed by a revolving mechanical distributor to eight four-cell Bendelari jigs, in parallel. Here an enriched zinc middling is made and sent to cleaner jigs. Also a lead middling is made from the last two cells of each jig, which is elevated and dewatered to two four-cell Bendelari jigs for retreatment. Here again an enriched middling is made to go to the cleaning circuit, while the lead middling is sent to the ball-mill circuit. A tailing is made from all the jigs, which is dewatered and discarded.

#### Cone Handles 65 Percent Original Feed

Washed minus 1 1/2-in., plus 3/16-in. material from the Robins screens in the secondary crushing plant constitutes the feed for the cone plant. This is roughly 65 percent of the original feed to the mill. This part of the ore is collected from the screens by a cross-conveyor, which delivers it to a

slow-moving steep belt conveyor, where it is dewatered to some extent, then it is conveyed to a 500-ton storage hopper, which is equipped with a wide, slow-moving, steep dewatering belt conveyor feeder. Here the final dewatering of the ore is completed, whence it is conveyed directly to the heavy-density media minerals separation process.

#### Action of the Cone

This plant has been named the "cone plant," due to the shape of the concentration tank. This tank is an

inverted cone 20 feet in diameter and 20 feet deep, equipped with a rugged set of rakes which revolve at a speed sufficient to help keep the media in suspension and facilitate removing the tailings produced in this concentration operation.

In operation, the cone is filled with lead media of approximately 2.70 gravity. The prepared feed is conveyed (see Fig. 1) to the top of the cone (1) and allowed to drop into the media near the center of the cone (2). Here the separation of the lighter and heavier particles of ore begins.

The action of the rakes causes the media to revolve in the cone, which in turn carries the lighter particles of ore, or tailings, nearer to the outer edge of the cone, where they are overflowed through an opening about five feet wide into a launder tangent to the cone, and onto two double-deck, 4 x 8-ft. Allis-Chalmers low-head type drainage screens in parallel (5). The lower deck is equipped with a 1 1/2-millimeter punched plate screen. The upper deck acts as a protecting screen to the lower deck, and has on it a 1/4-in. round hole punched plate.

Media which drains from the tailings is pumped back to the top of the cone (8). The drained tailings go onto two 4 x 14-ft. single-deck, low-head Allis-Chalmers screens (6), equipped with 1/4-in. round hole punched plate, where the remaining lead media is washed from the tailings by specially designed sprays. The washed tailings are conveyed to waste or cars for shipment (12).

Heavier particles of ore, or concentrates, settle to the bottom of the cone, where they are air-lifted up through the hollow shaft of the rake mechanism, and laundered to a 3 x 14-ft. low-head Allis-Chalmers screen (3), where the media is drained off the first half of the screen and

Cone plant at the Central mill, with decantation and surge tanks of reclamation unit in foreground



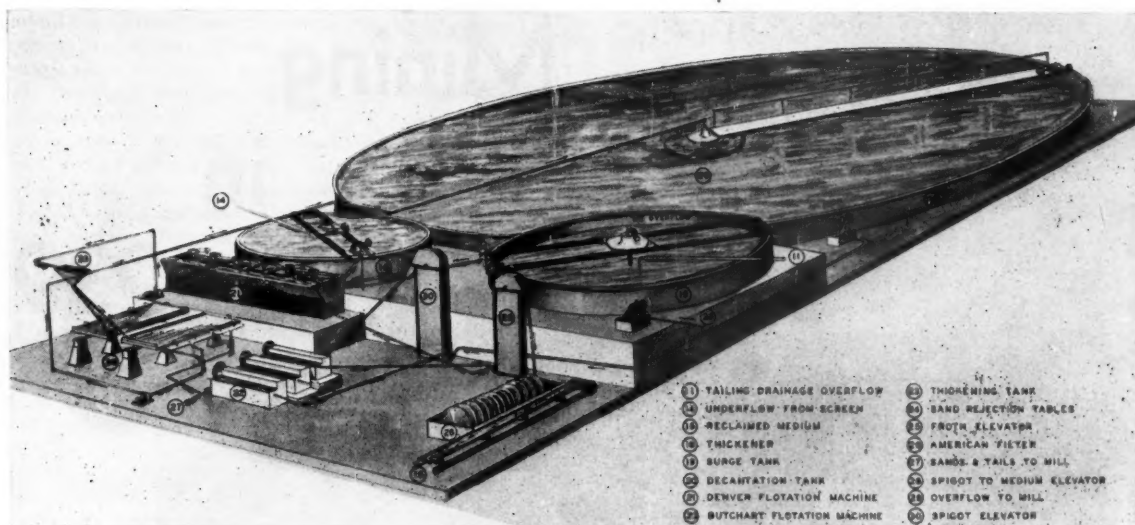


Fig. 2. Reclamation circuit operated in conjunction with the cone plant. It reconditions as well as reclaims the valuable lead media

returned to the top of the cone. The remaining media (4) is washed off while the concentrates are traveling over the final half of the screen.

#### Recovery of Media

Media washed from the concentrates (4), and tailings (6), is laundered to a 4 x 8-ft. Tyler screen (7), equipped with a two-millimeter punched plate deck. The oversize is washed, and that portion from the concentrate screen is delivered to the concentrate belt, while that portion from the tailings screen is delivered to the tailings conveyor (13).

The media recovered by washing the concentrates and tailings is laundered (see Fig. 2) to a 20-ft. Dorr thickener (14). The thickened media is pumped to a six-cell Denver Sub-A flotation machine (21), where the lead is cleansed from the gangue, then elevated (25) to four sets of American filters (26), and the water filtered off. The filter cake is conveyed (15)

and elevated (10) back to the media storage cone (9) to be used again in the operating cone (2).

Lead media in the overflow of the 20-ft. thickener is settled in an 80-ft. thickener (20), from which it is pumped and elevated (30) to three Butchart flotation machines (22) to be cleaned from gangue. The cleaned lead follows the same circuit as the lead from the Denver cells. The tailings from both flotation circuits are combined with the feed of the main mill flotation circuit.

#### Final Stages of Concentration

Concentrates from screen (4) are conveyed to the main mill circuit, where they are ground down to pass 7/16-in. screen, and are subsequently jigged to recover the free coarse lead and zinc. The tailings from this process are dewatered in drags and elevated to a storage hopper, from which they are conveyed to two 8 x 6-ft. Marcy ball-mills in closed circuit with 8-ft.

Dorr classifiers and one 6-ft. Allis-Chalmers ball-mill in closed circuit with 3-ft. Dorr classifier, all in parallel. The classifier overflow, together with the thickened slimes from all the waters used in the jigging and screening processes, constitute the feed for the flotation department.

Here the lead is recovered by two 14-cell mineral separation machines, and cleaned on a 6-cell Denver Sub-A machine. The final product is filtered and shipped. This product is also used as a make-up media in the cone plant.

The zinc is recovered by a 14-cell mineral separation machine in parallel with two 14-cell Denver Sub-A flotation machines and a 6-cell Fagergren unit. The zinc concentrate is cleaned over a 10-cell Denver Sub-A flotation unit, from which the cleaned zinc concentrate is filtered by two Dorrco drum-type filters and conveyed directly to cars for shipment.

The tailing from the zinc roughing circuit goes to waste.

#### N. C. Mining Industry Benefits From Price Advance

Mines in western North Carolina, especially the mica, kaolin and feldspar mines, are busier than ever as a result of higher prices and larger orders, State Geologist H. J. Bryson said recently on his return from a trip through the minerals producing regions.

Demand for North Carolina minerals is increasing sharply, as industries which use these minerals feel the pinch of the war in Europe on materials formerly imported.

"The mica industry is undoubtedly

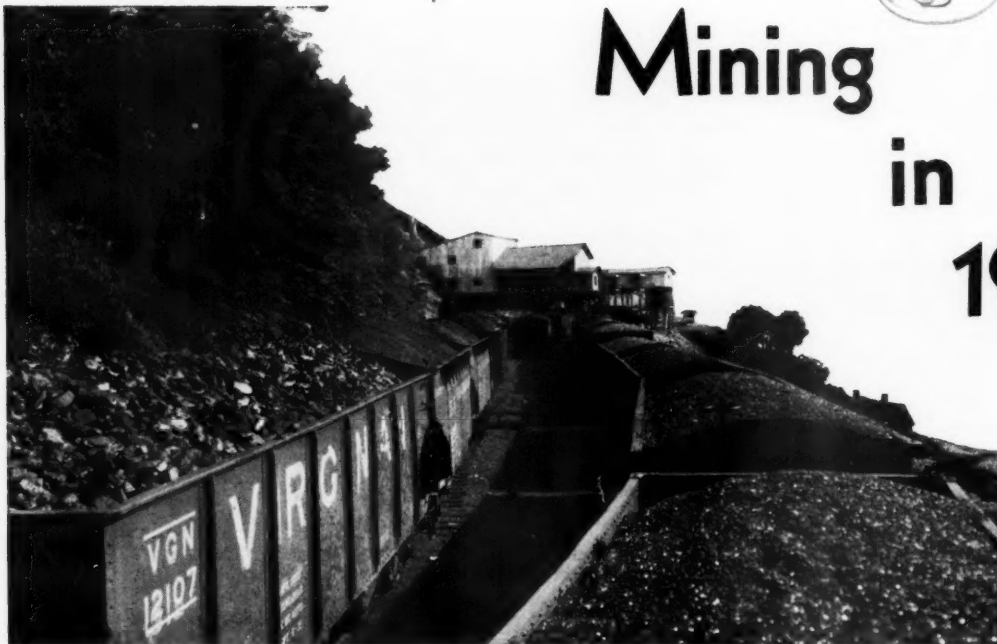
more active in North Carolina now than in the past 10 or 12 years, and every washing and grinding plant is running at full capacity, most of them 24 hours a day," Bryson said. "All of the larger mines are also operating night and day, while more than 200 small mines, many of them little more than holes in the mountain sides, are being operated by the mountaineers, and the mica hauled into the washing plants.

"The unusual demand for mica has sent the price up and is proving a God-send to many of the mountain people who otherwise would be in want. Mica that six months ago was

bringing only \$5 and \$10 a ton is now bringing from \$15 to \$20 a ton and frequently more. The larger mica, large enough for washers and punch purposes, brings from \$150 to \$250 a ton, while mica as much as 4 x 6 inches in size now brings from \$2.50 to \$2.60 a pound, which is from \$5,000 to \$5,200 a ton."

The demand for kaolin, used in making china and pottery; also feldspar, has likewise increased as imports from Europe have been lessened, compelling manufacturers to use more domestic supplies, Bryson said. The best and nearest supplies of these clays and minerals are to be found in North Carolina, he explained.





# Mining in 1939

Coal—the backbone of industry in this age of power

## BITUMINOUS COAL Showed Wide Variation in Production Levels

By **HOWARD N. EAVENSON**  
Eavenson, Alford and Auchmuty  
Pittsburgh, Pa.

**A**T THE beginning of 1939 most bituminous coal producers thought that their position during the year, if changed at all, would probably be bettered, as a slight increase in business was anticipated on account of the probabilities of an improvement in industrial affairs.

The weather in January and February caused an unexpectedly large carry-over of domestic sizes at the lakes. There was some stocking pending the wage negotiations in the latter part of March, which no one thought at that time would cause any material shut-down. Prices during the winter were low, and when the unexpected deadlock over the union shop developed there was, of course, an increase in price for what little coal could be shipped to those who were compelled to buy. Generally, during the six-week

shut-down, it can be said that no one suffered for the want of coal, and immediately after the suspension was over prices again resumed their downward course.

### Further Delay in Minimum Prices

Most producers anticipated that certainly well before the year was out that the Coal Commission prices would be effective, but when hearings were renewed on the new prices it soon developed that a much longer time would be taken in the price hearings and in coordination work than was anticipated. At the moment we still are looking forward to the establishment of prices, probably during the spring, but many operators will not be surprised if a considerably longer time than this elapses before the prices



finally become effective. Price hearings have been continuous before and after the abolition of the Commission and the transfer to the Department of the Interior, but it is evident now that it will be after the first of the year before the final hearings are perfected. What will develop then no one can now say.

The competitive situation with

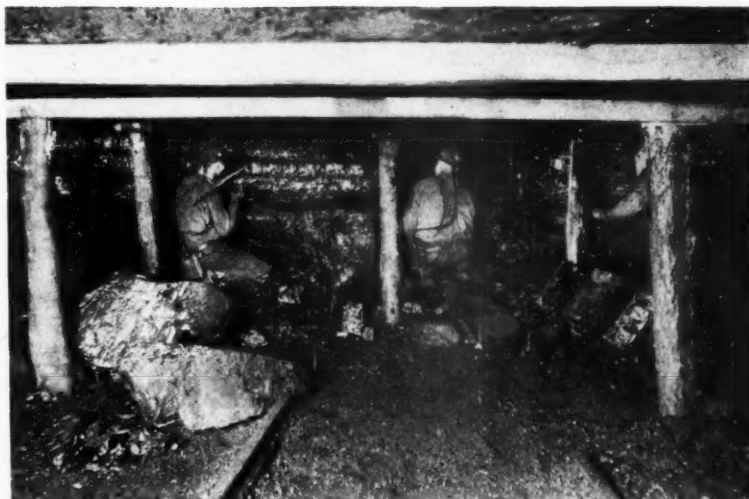
liquid fuels has not been improved, excepting in spots. There are some places where the supply of natural gas has decreased, and some of the large consumers have had their supply cut off or greatly reduced, and these have returned to the use of coal. On the other hand, pipe lines have been extended to some markets and have taken some business from the coal industry.

The reduction of the import tax on oil from Venezuela and other countries under the Most Favored Nation Clause, will not tend to decrease the amount of oil consumed along the seaboard. How much this will affect coal will depend entirely on the relative prices.

The sale of small stokers throughout the year has been good, but the percentage of them that have been installed in new homes or in the new housing projects has been trifling, and, until some means are developed to enable coal to enter this class of building, the relative situation of coal and oil in domestic heating will not be greatly bettered.

#### War Boom Lasted Two Months

After the outbreak of the war there was a "boomlet" in the bituminous industry which lasted over two of the fall months, and which at first apparently caused some operators to think that the good old days of 1920 were going to return. As soon, however, as industry had filled its stocks and it was seen that there would be no great increase in our industrial output for at least a number of months, and that the amount of coal that we would ship abroad would be very small, the increase in production stopped and the



Better working conditions contribute to greater safety

lowering of prices resumed its normal trend. While the production of coal for the year 1939 (389,000,000 tons) showed a moderate increase over that of 1938 (345,000,000 tons), it was still well under the 1937 figure of 446,000,000 tons. There was an unusual amount of coke shipped to foreign countries.

There was no change during the year in railroad charges, and the railroads unexpectedly fulfilled all of the demands for transportation during the fall months when the rapid increase came, and for more than a month they satisfactorily handled a greater daily output than had ever been produced in a similar period.

#### Mechanized Mining Continues Gains

Mechanization through the year

maintained its steady pace, and in every field the use of both mobile loaders and conveyors increased. In a number of mines, where conditions were favorable, the use of rubber-tired equipment for handling the coal back of loading machines began, and where conditions are favorable it seems that this will be a decided improvement in many respects.

The use of larger capacity trucks back of stripping operations has grown steadily, as has the use of trucks in transporting coal over greater distances.

Some work was continued at several institutions on research, but the amount of money spent has been trifling, considering the importance of the subject to the coal industry.

## ANTHRACITE Output Increases, But Prices Unfavorable\*

THE production of Pennsylvania anthracite in 1939 is estimated at 50,807,000 net tons, an increase of 10.2 percent over 1938. Probably a fourth of the increase was due to larger exports to Canada, resulting, in part at least, from the European War.

State legislation to control the industry failed by a narrow margin.

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The wage agreement, virtually unchanged, was renewed for another two years.

There were no important changes in freight rates. The so-called motor-compelled rates were again extended,



J. R. BRADLEY



Twilight silhouette  
of the Prospect  
Breaker of Lehigh  
Valley Coal Co.

and legitimate trucking of anthracite is believed to be increasing.

Such information as is available indicates little or no increase in the movement of illicit or "bootleg" coals in 1939.

Weather conditions have an important bearing on the consumption of anthracite, inasmuch as it is chiefly a domestic fuel. Weather conditions in the principal anthracite-consuming areas during 1939 were generally unfavorable. The increase in production was due to improved business conditions and perhaps, to a slight extent, to the partial suspension of operations in the bituminous-coal industry.

The price situation early in the year led some to believe that measures taken within the industry or by the Pennsylvania State Legislature would rectify or ameliorate financial conditions within the industry. However, legislation failed to pass and agreements were not adhered to, therefore little if any benefits resulted. At the close of the year sentiment seemed to indicate that an effective agreement covering the greater part of the industry might be reached and an improved price situation result. The alternative may be State legislation embodying production quotas.

#### Two Brief Periods of High Activity

The industry enjoyed two brief periods of greater activity, both caused by unusual circumstances. The first occurred during the second quarter of the year, when failure to reach a new wage agreement covering the Appalachian bituminous-coal industry caused partial suspension of operations, resulting in the sale of a certain tonnage of anthracite steam sizes. The second was in September and October, growing out of the declaration of war in Europe and the prospective

shortage of anthracite in the Canadian market. A number of properties that had been inoperative for varying periods were reopened, and at some mines double shifts were worked.

Production in the first quarter of 1939 approximated that in the corresponding period of 1938. Production in the second quarter of 1939, aided to some extent by the partial suspension in the bituminous-coal fields, was about 16 percent above the 1938 quarter.

The attempt of certain operators to obtain the cooperation of other producers in stabilizing prices continued to be unsuccessful, and production in the third quarter was nearly one-third greater than in 1938. In the last month of the third quarter the industry was given a fillip by the outbreak of the war in Europe, prices improved, and production was 4,776,000 tons as against 3,388,000 tons in September, 1938. The movement carried over into October, when output was 4,919,000 tons as compared with 4,180,000 tons in the same month of 1938. In October retail yards apparently were well-stocked, banked coal in the hands of producers was high, and there was said to be a tremendous tonnage on cars and at tidewater, with the result that tidewater prices probably set an all-time low record. November production was slightly higher than in 1938. December production declined 14.8 percent compared with 1938, but the October-December quarter showed an increase of 2 percent over the corresponding quarter of 1938.

#### Price Situation Unfavorable

Production increased but the price situation was unfavorable.

Many of the causes of the deplorable price situation in 1939 are rooted

in the past. Some of the consequences might have been prevented; others could not have been. The net result was derived from a variety of developments. Some of the causes were: Surplus capacity, passed on from the prosperous days of the industry; competitive fuels, the extent of which could not well be foreseen; the great depression, with lessened consumption of many commodities, including anthracite; increased production costs; and plant expansion at the beginning of a period of greatly reduced demand.

The pressure of these and other factors prompted developments that apparently tended to decentralize the industry. In the first half of the decade just ended, lack of employment instigated and fostered the illicit or "bootleg" coal trade. Some of the largest units in the industry became financially insolvent, and important units thought it best to lease some of their holdings to other (mainly new) concerns. The course of these events culminated in 1939 in unparallel price cutting, and the net returns per ton of coal sold in 1939 will doubtless be the lowest in decades. Typically, a lower price results in an increased and broadened demand for a commodity. However, inspection of the Bureau of Labor Statistics on retail coal and other fuel prices as of the 15th of March, June, September, October, and November, 1939, indicates that the reduced mine prices were not carried through to the consumer, and thus an opportunity to widen the market for Pennsylvania anthracite was lost.

Tending to confirm the foregoing statements it might be said that in 1929 the productive capacity of the anthracite industry on a 303.5-work-day year was about 100,000,000 tons, and the capacity to produce deep-mined coal was about 96,000,000 tons. On the basis of the present 7-hour day, 5-day work-week the capacity to produce deep-mined anthracite was approximately 79,000,000 tons. In 1938, deep-mined anthracite totaled 38,093,000 tons, or less than 50 percent of capacity. Few industries can operate profitably at 50 percent of capacity.

#### Percentage Deep-Mined Anthracite Dropping

In 1929 deep-mined coal represented 96 percent of the total production, in 1932 the percentage had declined to 89, in 1935 to 87, and in 1938 it had dropped to 80 percent of the total. Production costs of



deep-mined coal are more than those of strip-pit, culm-bank, or river-dredged coal.

The reduction in deep-mined anthracite probably is reflected from new concerns that have entered the industry (mainly perhaps on lands leased from producers formerly more important) and who have turned their attention chiefly to stripping and other low-cost operations.

#### Tendency to Decentralize

Finally, a comparison of reports prepared by the Department of Mines, Harrisburg, shows that, in 1929, 54 mines were producing more than 100,000 tons each, and while there were about the same number of mines of this category in operation in 1938, only 22 of the original companies were represented, indicating a high

mortality rate in the industry. Decentralizing is evidenced by the fact that in 1929 eight companies produced nearly 64 percent of Pennsylvania's production, whereas in 1938 these same companies produced only 52 percent.

#### Exports Increased

The export trade, practically all with Canada, will show a considerable increase. Official statistics for December are not yet available, but it is believed that the total for 1939 will be about 700,000 net tons more than in 1938. Exports for January-November, 1939, totaled 2,473,108 net tons (2,461,145 tons to Canada) compared with 1,749,069 tons in the same period of 1938, when 1,736,504 tons went to Canada.

With continuation of the war in

Europe it is improbable that regular supplies from abroad will be received in Canada and New England, although it can be expected that some coal will continue to arrive from Great Britain and French Indochina. Coal-mining costs in Great Britain are increasing; however, the import duty on Pennsylvania anthracite and the difference in Canadian and United States foreign exchange favor Welsh anthracite to the extent of about \$1 a ton.

Imports of anthracite in the January-November period of 1939 totaled 290,754 net tons—212,444 tons from the U. S. S. R. and 59,498 tons from Great Britain—but in the corresponding period of 1938 imports totaled 331,692 net tons—184,837 tons from the U. S. S. R. and 138,929 tons from Great Britain. Imports for December 1939 probably will be small.

## Sales of MECHANICAL LOADING EQUIPMENT for use in Coal Mines in 1939

**S**ALES of equipment for mechanical loading of coal showed a decided upturn in 1939 following the lows registered in last year's reports. Orders for new mobile loaders recovered to the 1937 level, while sales of conveyors and duckbills established all-time high records. Sales of scraper loaders also exceeded last year's by a substantial figure, although not approaching the volume of business done in this type of equipment when it was in high favor in the early thirties. Pit-car loaders, alone among the various types of loading equipment, showed a decrease in sales in 1939.

The increased rate of introduction of mechanical loading equipment in 1939 was in keeping with the general increase in activity of the coal industry during the year. It is noteworthy, however, that the progress of mechanization outran the general improvement in the coal business as indicated by the trend of production. In terms of total capacity, the 1939 sales of loading equipment topped 1938 sales

\* Messrs. Fraser, Tryon and Gallagher are members of the Research Section, Bituminous Coal Division. Mr. van Siclen is Chief Engineer, Coal Economics Division, U. S. Bureau of Mines. Published by permission of the Director of the Bureau of Mines.

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**F. G. TRYON**  
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**M. van SICLEN\***

by 21.4 percent, whereas the 1939 total production of bituminous coal and anthracite exceeded 1938 production by 12.8 percent.

#### Total Units Sold by Type

Total sales of mobile loading machines reported in 1939 amounted to 292 units, exactly duplicating the 1937 total. This figure is substantially under the record for the peak year 1936 when 344 units were sold, but much in excess of the preceding years up to 1936, during which time loader sales were increasing consistently year by year. Aggregate sales of face conveyors of all types established a high record of 1,311 units in 1939. This figure includes both hand-loaded conveyors and those equipped with duckbills and other self-loading heads. It involves some overlap in reporting sales of the duckbills themselves and sales of the shaker conveyors on which they are used, the extent of which

cannot be precisely determined. Making rough allowance for the possible duplication in reporting, the net increase in the number of conveyor units sold in 1939 is 21.6 percent over the year before—almost exactly the same as the increase in mobile loaders.

The largest increase in conveyor sales occurred in the shaker types equipped with duckbills or other loading heads, shipments of duckbills more than doubling from 1938 to 1939. Sales of equipment of these types were widely distributed, but the increase was especially marked in the Appalachian region with many new users in West Virginia, Pennsylvania and Kentucky. At the same time sales of hand-loaded conveyors established a new, though less spectacular, record.

The accompanying tabulations include a small number of conveyors sold for use in conjunction with mobile loaders; conveyors intended for

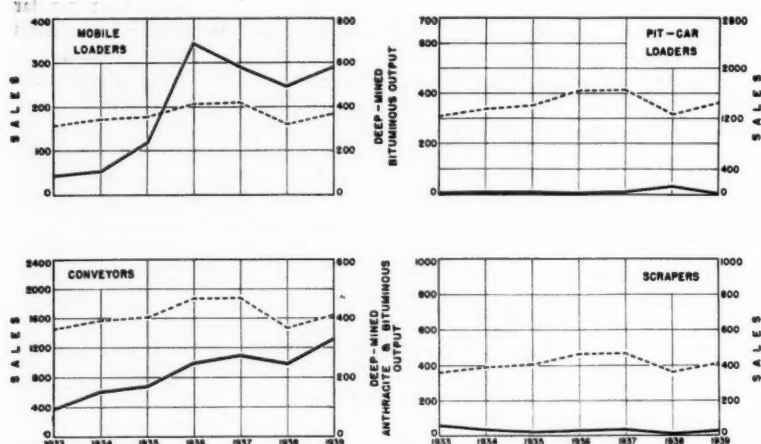


Fig. 1. Number of underground loading devices sold for use in coal mines, 1933 to 1939 (total U. S. output, in millions of tons, shown by dotted lines)

transportation in haulage-ways or slopes are not included.

Sales of pit-car loaders dropped off to the lowest figure of record, with two units reported for the entire bituminous field. This indicates a continuation of the trend observable in recent years toward the introduction of more completely mechanized methods of loading.

Manufacturers of scraper loading machines reported sales of 26 units in 1939 as compared with only 10 in 1938. This represents a larger percentage increase than that experienced in any other branch of the industry, but the relatively small gross volume of sales involved limits the significance of the percentage relation.

Manufacturers again reported scattering sales of mechanical loading equipment for export, chiefly to Australia. Statistics on this division of the industry are not included.

The trends of sales are shown graphically in Figure 1. The scales in this figure are proportioned to give a rough indication of the relative importance of the several types of equipment in terms of capacity. New mobile loading equipment purchases in 1939 account for the larger proportion of the total increase in mechanical loading capacity added during the year. This conforms to the experience of the past several years. Conveyors, however, represent a larger part of this increased capacity than in former years.

The dotted lines of the chart show the total production of coal from the deep mines (all other than strip operations) of the United States. Since virtually all the mobile loaders and pit-car loaders in use are in the bi-

## Total Sales by States

Purchases of mechanical loading equipment were made for installation in 19 of the coal-producing states in 1939, adding Michigan to the previous list of users.

Table 2 has been prepared to show the total number of units placed in each state or region. In a few states separate figures could not be shown without disclosing the business of individual manufacturers. On each item, letter symbols indicating the kinds of machines are arranged in proper sequence to show roughly the order of importance of the several types of equipment in the year's business in terms of capacity. For example, West Virginia operators pur-

TABLE 1.—MECHANIZED LOADING EQUIPMENT SOLD TO BITUMINOUS AND ANTHRACITE MINES AS REPORTED BY MANUFACTURERS, 1933 TO 1939, INCLUSIVE <sup>a</sup>

	1933	1934	1935	1936	1937	1938	1939	Percent increase (+) or decrease (—) 1939 over 1938
Mobile loaders .....	41	55	115	344	292	241	292	+ 21.2
Scrapers <sup>b</sup> .....	65	34	22	28	29	10	26	+160.0
Conveyors <sup>c</sup> .....	396	610	681	994	1,095	990	1,311	<sup>d</sup> + 21.6
Pit-car loaders .....	18	26	28	11	32	139	2	— 98.6

<sup>a</sup> The figures for 1933 to 1936 included reports from 28 manufacturers. In 1937 one manufacturer indicated that he was no longer producing this type of equipment and accordingly was dropped from the active list; however, at the same time another manufacturer was added to the list, and the number of reporting firms remained at 28. In 1938 one manufacturer of material handling machinery began the production of underground loading equipment, and in 1939 two new manufacturers entered the field, increasing the total number reporting to 31.

<sup>b</sup> Reported as scrapers or scraper haulers and hoists.

<sup>c</sup> Includes hand-loaded conveyors and those equipped with duckbills and other self-loading heads. As sales of both loading heads and shaker conveyors are counted, the figures involve a certain measure of overlap, which cannot be determined accurately. It should also be noted that a small number of conveyors sold in recent years, particularly in 1936 to 1938, were for use in conjunction with mobile loading machines.

<sup>d</sup> The figure of + 21.6 percent represents the approximate net increase in the number of conveyor units sold, after allowing for overlap in counting self-loading heads and shaker conveyors as explained in note c.

tuminous field, the charts for these two types show the bituminous deep mine production only. In the charts of scraper loader sales and conveyor sales, the combined bituminous and anthracite production from underground mines is used.

## Sources of Information

The statistical data of this paper are based on reports courteously furnished by all the known manufacturers of loading machinery for underground use in coal mines. All of the firms supplying such information continue with a uniform method of reporting, and the figures may be accepted as directly comparable from year to year.

## Types of Machines Sold

Varying trends in the adoption of new equipment for loading coal are shown in Table 3, which compares recent installations with the number of machines previously in service. The number of mobile loaders in active use by producers of bituminous coal increased from 488 in 1929 to 980 in 1936, the year when the last complete enumeration was taken. The number

chased a total of 471 units of mechanical loading equipment in 1939; in this aggregate of new equipment, mobile loaders furnished the largest addition to capacity, followed by conveyors, scraper loaders and pit-car loaders in the order named.

TABLE 2.—TOTAL NUMBER OF UNITS OF MECHANIZED LOADING EQUIPMENT SHIPPED FOR USE IN EACH STATE OR REGION IN 1939

(L—Mobile loading machines; P—Pit-car loaders; S—Scrapers;  
C—Conveyors and duckbills)

	Number of units of all types shipped in 1939	Types of equipment in approximate order of capacity in 1939
Northern Appalachian States:		
Pennsylvania	315	L.C.S.
Ohio and Michigan	62	L.C.
Southern Appalachian States:		
West Virginia	471	L.C.S.P.
Virginia	60	C.L.
Kentucky	158	L.C.
Alabama	97	C.S.L.
Tennessee	42	C.L.
Middle Western States:		
Illinois	56	L.C.
Indiana	14	L.C.
Trans-Mississippi States:		
Arkansas and Oklahoma	18	C.L.
Iowa	2	L.
Colorado	50	L.C.
Utah and Montana	19	C.L.
Wyoming	40	L.C.
North Dakota and Washington	3	C.
Total bituminous	1,407	L.C.S.P.
Pennsylvania anthracite	224	C.S.
Grand total	1,631	L.C.S.P.

of new machines installed in the last three years approaches the total in use as of 1936. The total number of mobile loaders available for service now amounts to approximately 1,805, assuming those installed in previous years to be in operating condition.

Because of a somewhat uncertain conception of what may properly be defined as a face conveyor unit for statistical purposes, the record of deliveries of conveyors is probably not as accurate as that of mobile loaders.

However, the methods of counting and tabulating used in this series of reports have been maintained consistently from year to year, and the general upward trend of conveyor installations is definitely established. Sales of conveyors have shown a more uniform rate of increase than any other type of loading equipment. Increased activity in this division of mechanization was particularly marked in 1939, both as to aggregate volume of new business during the year and

as to the widespread distribution of the equipment.

Sales of scraper loaders have held in a rather narrow range since 1933, new units placed in operation being around 20 to 30 a year in each year except 1938 when the total dropped to 10. Sales for 1939 totaled 26, of which 8 went into the Pennsylvania anthracite field and 18 were distributed among Alabama, Tennessee and West Virginia bituminous fields. While the number of scrapers in use has declined since 1930, the continued sale of a small number of new units each year indicates that there are certain conditions which favor the use of this method of loading.

In the Pennsylvania anthracite region the use of scraper loaders reached a peak in 1934 and has likewise declined steadily since that period, but a few units of new scraper loading equipment continue to go into that territory each year.

#### Regional Distribution of Mechanized Capacity

The record for 1939 shows a continued growth of mechanization in the Appalachian region, where activity has been increasing at a rapid rate in the past few years. Pennsylvania operators, for example, purchased 23 mobile loading units in 1937; 47 in 1938; and 89 in 1939, adding in the single year 1939 almost as many units as were in operation in 1936. A very large proportion of these, although not all, went into the western part of the state to operators

TABLE 3.—SALES OF MECHANIZED LOADING EQUIPMENT IN 1937 TO 1939 COMPARED WITH TOTAL NUMBER OF MACHINES IN ACTIVE USE IN PRECEDING YEARS

	Number of machines in active use, as reported by mine operators						Number of machines sold as reported by manufacturers			
	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939
Bituminous mines:										
Mobile loading machines	545	583	548	523	534	657	980	292	241	292
Scrapers	150	146	128	93	119	78	106	13	6	18
Pit-car loaders	2,876	3,428	3,112	2,453	2,288	2,098	1,851	32	139	2
Conveyors equipped with duckbills and other self-loading heads	140	165	159	132	157	179	234	†835	†749	†1,095
Hand-loaded conveyors—number of units	*	*	*	525	574	670	936			
Anthracite mines (Pennsylvania):										
Mobile loading machines	384	5	11	18	14	1	504	16	4	8
Scrapers		457	479	455	517	507				
Pit-car loaders		28	24	19	25	22				
Conveyors equipped with duckbills and other self-loading heads	421	1	17	12	13	30	1,790	†260	†241	†216
Hand-loaded conveyors—number of units		547	818	940	1,338	1,563				

\* Number of units not reported in these years.

† Reported as face conveyors (hand-loaded), "shaker drives" and "duckbills." The figures of numbers sold in 1937, 1938, and 1939 are not exactly comparable with the number in use in 1936 because of uncertainties in defining what constitutes a conveyor, and because of certain overlaps in the reporting of duckbill loading heads and of shaker conveyors.



TABLE 4.—COMPARISON OF MOBILE LOADERS, SCRAPERS, AND CONVEYORS IN ACTUAL USE IN 1936, WITH SALES REPORTED IN 1938 AND 1939 BY REGIONS

	Mobile Loaders			Scrapers			Conveyors <sup>a</sup>		
	In use in 1936	Sales in 1938	Sales in 1939	In use in 1936	Sales in 1938	Sales in 1939	In use in 1936	Sales in 1938	Sales in 1939
<b>BITUMINOUS</b>									
Northern Appalachian States:									
Pennsylvania .....	92	47	89	31	...	1	366	52	225
Maryland .....	..	..	..	..	..	..	..	..	..
Ohio .....	47	15	17	..	..	..	18	23	..
Michigan .....	..	..	..	..	..	..	..	..	45
Southern Appalachian States:									
Alabama .....	10	} b 39	7	27	2	8	64	64	82
Kentucky .....	..		..	..	..	..	35	98	131
Tennessee .....	5		28	11	..	..	21	20	41
West Virginia .....	126	80	85	..	3	9	196	332	375
Virginia .....	9	9	8	..	..	..	70	5	52
Middle Western States:									
Illinois .....	431	} c 38	28	..	..	..	..	20	28
Indiana .....	146		12	..	..	..	7	..	2
Trans-Mississippi States .....	d 114	e 13	f 18	g 37	h 1	..	i 393	j 135	k 114
Total bituminous .....	980	241	292	106	6	18	1,170	749	1,095
<b>ANTHRACITE</b>									
Pennsylvania .....	..	..	..	504	4	8	1,790	241	216
Grand total .....	980	241	292	610	10	26	2,960	990	1,311

<sup>a</sup> Includes hand-loaded conveyors and conveyors equipped with duckbills or other self-loading heads. The figures of numbers in use in 1936 are not exactly comparable with the number sold in 1938 and 1939 because of uncertainties in defining what constitutes a conveyor and because of overlap between sales of duckbill loading heads and shaker conveyors. The comparison, however, will serve to indicate which regions have the largest proportionate increases. <sup>b</sup> Mostly in Kentucky. <sup>c</sup> Mostly in Illinois. <sup>d</sup> Includes Colorado, Montana, New Mexico, North Dakota, Utah and Wyoming. <sup>e</sup> Includes Colorado, Montana, Oklahoma, Utah and Wyoming. <sup>f</sup> Includes Colorado, Iowa, Montana, Oklahoma, Utah and Wyoming. <sup>g</sup> Includes Arkansas, New Mexico, Oklahoma and Wyoming. <sup>h</sup> Missouri. <sup>i</sup> Includes Arkansas, Colorado, Iowa, Montana, Utah, Washington and Wyoming. <sup>j</sup> Includes Arkansas, Colorado, Iowa, Oklahoma, Utah and Wyoming. <sup>k</sup> Includes Arkansas, Colorado, Montana, North Dakota, Oklahoma, Utah, Washington and Wyoming. <sup>l</sup> Includes a few pit-car loaders.

in the Pittsburgh and Freeport Seams. Pennsylvania took a larger part of the year's production of mobile loaders than any other state. It was closely followed by West Virginia, where a total of 85 new units were installed last year compared with 80 in 1938, and 73 in 1937. This makes a total of 238 installations during the past three years, or almost twice as many as the entire number of machines in use in the state previously. Pennsylvania and West Virginia together took 60 percent of the total deliveries of mobile loaders in 1939.

The Appalachian region also extended its lead in the installation of new conveyor units. These went in large part into the Central Pennsylvania region and into widely distributed sections of West Virginia, Virginia, Kentucky and Tennessee. West Virginia operators alone installed 375 new conveyor units in 1939, followed by Pennsylvania bituminous operators with 225 units, and by the Pennsylvania anthracite operators with 216 units. These two states together took 816 units in 1939, constituting approximately 62 percent of the total sales of conveyors last year. Alabama, Kentucky and Ohio operators also purchased new conveyor equipment in increasing volume in 1939.

Bituminous operators of the Middle

West and Trans-Mississippi regions, where the trend to mechanization manifested itself on a large scale in the late twenties, continued the purchase of new equipment at about the same rate as in the preceding three years. The shift from hand to mechanical operation is still going on in those regions, though at a somewhat more moderate rate than in the years of initial growth. Early adoption of

mechanical loading was especially favored by the thick beds worked in large areas of those sections of the country and by relatively high wage rates prevailing there as compared with the Eastern and Southern fields prior to 1934.

Figure 2 shows for each producing region the relation of new installations to total capacity of mechanical equipment previously in use. This

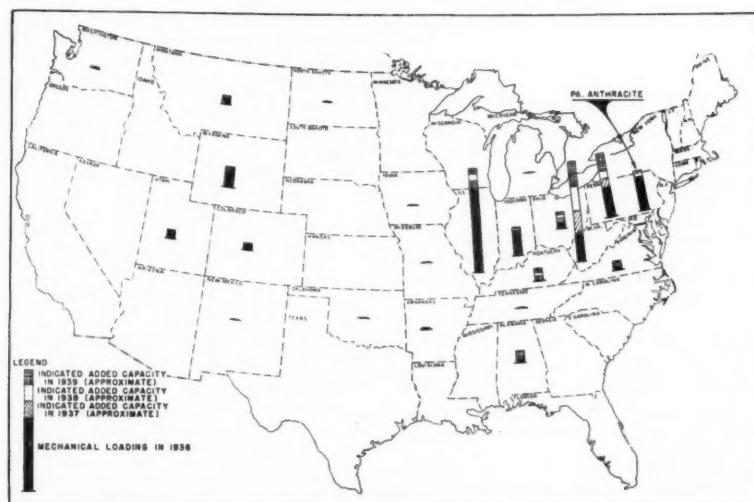


Fig. 2. Tonnage of coal mechanically loaded in 1936 and approximate capacity of new equipment shipped in 1937, 1938 and 1939

graphic presentation of the data is necessarily approximate. Accurate statistics of the total tonnages of coal loaded mechanically in 1939 are not yet available. However, such data as are at hand corroborate the general trend indicated by the sales of equipment. In West Virginia, for example, 20,554,675 tons of coal were loaded by machines and conveyors in the first nine months of 1939, amounting to 27.9 percent of the total production in the state in the same period. The corresponding figures for the first nine months of 1938 were 12,908,202 tons, or 19.8 percent of the total production.

#### Number of Mining Companies Using Mechanical Loading Equipment

Mechanization of coal loading operations continued to spread to new fields and new companies in 1939, as indicated by many new purchasers of equipment during the year. Table 5 shows the number of separate purchasers of mobile loaders by states and regions, divided into two categories—(1) former users and (2) new users who purchased for the first time during the current year. According to operators' reports, there were 149 bituminous coal companies using mobile loaders in 1936. Sales records of equipment makers show that at least 103 new users were added in 1937-1938 and 36 new users were again added to the list in 1939. This indicates a grand total of 288 or more companies that are now using or have used mobile loading equipment.

West Virginia had the largest number of new purchasers of mobile loaders in 1939, with 10 companies added to the list. There were 7 new purchasers in Pennsylvania, 4 in Virginia and 3 in Kentucky. The record also shows a substantial volume of repeat orders placed by companies

TABLE 5.—NUMBER OF BITUMINOUS COAL MINING COMPANIES THAT PURCHASED MOBILE LOADERS IN 1937-1938-1939  
(Based upon records covering 86 percent of the total sales)

	Users in 1936	Purchasers in 1937-1938 Former users	New users	Purchasers in 1939 Former users	New users
Northern Appalachian States:					
Pennsylvania .....	10	4	23	13	7
Maryland .....	2	..	..	..	..
Ohio .....	8	3	7	3	3
Southern Appalachian States:					
West Virginia .....	35	16	25	21	10
Virginia .....	5	2	5	1	4
Kentucky .....	2	2	24	10	3
Tennessee .....	2	1	1	..	1
Alabama .....	3	1	3	3	1
Middle Western States:					
Illinois .....	36	16	6	8	1
Indiana .....	23	5	4	5	1
Trans-Mississippi States:					
Arkansas .....	..	..	1	..	..
Colorado .....	2	1	1	..	2
Iowa .....	1	..	..	..	1
Montana .....	5	1	1	1	..
North Dakota .....	2	..	2	1	..
Oklahoma .....	..	..	..	1	1
Utah .....	7	4	..	1	1
Washington .....	3	..	..	..	..
Wyoming .....	3	2	..	1	1
Total .....	149	58	103	68	36

already using such equipment, indicating continued progress toward complete mechanization.

Face conveyors likewise went to many new users in 1939, but the reports of sales in this category were not all completely itemized so as to permit separation between repeat orders and new customers.

#### Trackless Gathering Equipment

The self-powered trackless haulage unit for gathering coal from loading machines is an innovation in coal mine mechanization which met with substantial interest during the past year.\*

These units consist of a battery-powered shuttle car or a battery-

powered tractor and trailer unit and are equipped with pneumatic tires. These units are employed to transport the coal from the mobile loader to a central transfer station located on the haulageway. Trailers may be of either bottom-dump or conveyor bottom type. Transfer of the load from trailer or shuttle car into mine cars may be effected either by means of a hopper or an elevating conveyor.

Gathering units of this type were installed in bituminous coal mines as early as 1936. The number of installations is now sufficient to make it advisable to record this development in the official statistics. Two manufacturers reported the sale of such equipment. A total of 96 units has been distributed to date to bituminous coal mines in seven states. In order of numbers installed, the states were Illinois, Kentucky, West Virginia, Indiana, Pennsylvania, Colorado and Ohio.

\* See "Mining Methods and Mechanization in Northern West Virginia," *Coal Age*, December 1939, page 51. Also, J. H. Fletcher, "Mechanical Mining Using Trackless Gathering," American Institute of Mining and Metallurgical Engineers, Technical Publication 1094 (New York meeting, February, 1939).

## Review of the IRON ORE Industry—1939

### Lake Superior Region

THE movement of iron ore from Lake Superior ranges in 1939 totaled 45,072,724 gross tons, by lake, with all-rail shipments of 475,000 tons (tentative figure) additional. As is shown by Table I, the Mesaba Range supplied about 30,000,000 tons, or two-thirds of the total. The Michipicoten Range of Ontario appears as

a shipper for the first time since 1922; the Algoma Iron Ore Properties (formerly the Helen mine) of the Algoma Steel Corporation, which last shipped from underground operations in 1918, began production in August from new

quarry operations. A total of 109,988 tons of sinter made from its carbonate ore was shipped during the season, beginning in August. Of this, 70,639 tons moved by water, the last cargo in December after the other ranges

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had ceased shipments; and 39,349 tons was shipped all-rail.

TABLE I.—LAKE SHIPMENTS—BY RANGES\*—1939

	Gross tons	Percent of total
Mesaba .....	29,996,992	66.55
Vermilion .....	1,398,000	3.10
Cuyuna .....	1,275,000	2.83
Total Minnesota .....	32,669,992	72.48
Marquette .....	4,832,227	10.72
Gogebic .....	5,341,939	11.85
Menominee .....	2,157,927	4.79
Total Mich.-Wis. .....	12,332,093	27.36
TOTAL U. S. RANGES .....	45,002,085	....
Michiganicoten (Canada) .....	70,639	0.16
GRAND TOTAL .....	45,072,724	100.00

\* Distribution of Lake Port shipments as between ranges is subject to some revision when final mine figures are available.

Shipments from the Lake Superior region for the past 30 years are shown by Table II, from which the wide fluctuations in the last decade are apparent. It is interesting to note that the 1939 shipment is less than a million tons greater than the 30-year average.

TABLE II.—ANNUAL MINE SHIPMENTS—LAKE SUPERIOR IRON ORE

From U. S. Ranges—1910-1939, Incl. (In thousands of gross tons)

Year	Shipments	Year	Shipments
1910 .....	43,442	1925 .....	55,535
1911 .....	32,802	1926 .....	59,970
1912 .....	48,220	1927 .....	52,344
1913 .....	49,952	1928 .....	54,856
1914 .....	32,741	1929 .....	66,157
1915 .....	47,266	1930 .....	47,188
1916 .....	66,673	1931 .....	23,496
1917 .....	64,430	1932 .....	3,589
1918 .....	62,837	1933 .....	21,672
1919 .....	48,553	1934 .....	22,064
1920 .....	60,419	1935 .....	28,504
1921 .....	22,799	1936 .....	45,204
1922 .....	44,001	1937 .....	63,110
1923 .....	60,771	1938 .....	19,550
1924 .....	43,896	1939 .....	45,548
30-year average ..		44,586	

Total shipments from all the ranges, including the Canadian, from before 1854 to 1939, inclusive, amount to 1,811,313,000 tons.

#### Reserves

Reserves of merchantable ores in Minnesota, Michigan and Wisconsin, as last reported by the taxing authori-

ties of the states, are approximately 1,400,000,000 tons. These, together with vastly greater tonnages of low-grade iron formation from which desirable furnace feed can be produced by concentration, indicate that the United States is amply fortified as to its long future iron supply, particularly if its public policies do not handicap its domestic production of ore, and of iron and steel, by creating unnatural advantages for the benefit of competing supplies of foreign origin.

Table III, comparing figures for 1939 and 1938 showing shipments, stocks, and consumption of Lake Superior ore, by months, together with the number of blast furnaces operating mainly on this ore, reveals clearly the general conditions in the industry during the past two years. The volume of production and consumption of ore in 1939 indicates that, as a whole, the year may be considered fairly satisfactory, especially in relation to recent years other than 1937. The remarkable pick-up in the industry during the last half of the year is notable; ore consumption in December, the peak month, was nearly double that of June, and large shipments of ore during the last part of the season reflect the increased consuming demand. A high rate of blast furnace operations continued through most of January, 1940, but reductions became apparent late in the month. The rapid decline recently evident in the volume of new business in iron and steel makes the outlook for the current year extremely uncertain. An ore-shipping season of average magnitude is about

TABLE III.—LAKE SUPERIOR IRON ORE

Month	Lake Shipments		Stocks of iron ore at furnaces and Lake Erie docks first day of month		Ore consumed by furnaces		Furnaces in blast last day of month. Using principally Lake Superior ore	
	1939	1938	1939	1938	1939	1938	1939	1938
January .....			34,578,849	40,774,838	2,926,706	1,923,056	93	70
February .....			31,688,905	38,881,832	2,852,540	1,726,585	93	71
March .....			28,840,053	37,158,401	3,316,691	1,980,182	97	71
April .....	56,798	260,514	25,872,124	35,223,301	2,799,769	1,853,658	80	64
May .....	3,601,453	1,180,703	22,790,933	33,676,333	2,245,513	1,711,146	82	60
June .....	5,572,998	2,837,745	23,071,214	33,011,974	2,829,667	1,471,660	90	54
July .....	6,309,938	3,267,813	25,861,237	34,329,223	3,143,337	1,674,721	102	59
August: U. S. ....	6,954,580	3,325,715	28,507,243	35,846,160	3,775,132	2,076,819	111	68
Canada .....	5,523							
September: U. S. ....	7,865,007	3,284,800	32,714,372	37,050,338	4,184,884	2,313,865	137	76
Canada .....	26,024							
October: U. S. ....	9,201,249	3,624,416	35,853,173	37,873,559	5,270,707	2,780,585	154	88
Canada .....	32,543							
November: U. S. ....	5,440,062	1,481,305	39,004,657	38,593,569	5,477,969	3,150,073	157	95
Canada .....	6,459							
December: U. S. ....			40,732,096	37,456,325	5,538,374	3,040,700	155	90
Canada .....					44,361,289	25,703,050	113 Avg.	72 Avg.
TOTAL: U. S. ....	45,002,085							
Canada .....	70,639							
TOTAL: By Lake .....	45,072,724	19,263,011						
All-Rail .....	475,000*	286,023						

\* Tentative.



as much as the mining industry dares hope for, at present.

### Activities on the Ranges

Underground mines have been in full operation since last September, generally working two shifts, five days per week. The mild autumn was most favorable to production, permitting the heavy fall demand for ore to be readily met with uninterrupted open-pit operations and late shipping on the Lakes.

The industry during the year witnessed expanding use of small tractor shovels, scrapers, heavy trucks and conveyors in connection with open-pit operations. Problems of improved concentration of low-grade ores continued to occupy the attention of operators looking ahead to the inevitable expansion of ore beneficiation. Of particular interest has been the heavy-density separation process, developed during the past few years at the Butler Brothers' Harrison plant on the Mesaba Range, using a finely ground ferro-silicon alloy as a suspension medium in 9-ft. cone separators of surprising capacity. The portion of the medium which adheres to concentrates and tailings is easily washed off and is recovered magnetically by efficient Crockett separators, thus overcoming the principal difficulties experienced with galena and other media previously used.

An item of general interest throughout the Lake Superior region in the fall of 1939 was the acquisition by Reserve Mining Company, headed by R. C. Allen, of the extensive holdings of Mesabi Iron Company (formerly known as the Argo mine) in the magnetite area of the eastern Mesaba Range, thus maintaining intact this vast property which was pioneered by D. C. Jackling and his associates. Exploration began there in 1912; and shipments from an experimental plant were made in 1918 and 1920 and from a commercial plant in 1922, 1923, and 1924. Stockpile shipments in 1929 and 1937 completed a total output of about 156,000 tons of high-grade bessemer sinter made from the quarried, hard, low-grade magnetite ore. This enormous tonnage of readily available iron formation may some time write a memorable chapter in the history of the Lake Superior region, when the high-grade hematite ores have largely concluded their contribution to it.

### Steep Rock Development

At the property of Steep Rock Iron



Trend to greater use of conveyors and trucks in open pits continued through the year

Mines, Inc., on Steep Rock Lake northwest of Port Arthur, Ontario (which will be its shipping port), shaft sinking continues, and reports indicate that the property is expected to be brought into production during 1940. High-grade hematite ore, in a body which may be very extensive, has been reported. The Ontario Government bonus of 2 cents per unit of iron, in contrast to the high tax burdens across the international border, must be a novel feature in the outlook for an iron mining enterprise in this region.

The Lake Erie prices per gross ton quoted for Lake Superior iron ores sold on the open market have remained unchanged since the figures published for 1937, i. e.:

	Old range	Mesaba	High-Phos.
Bessemer (51.5% Iron Nat.)	\$5.25	\$5.10	
Non-Bessemer (51.5% Iron Nat.)	5.10	4.95	\$4.85

### Other Regions

The U. S. Bureau of Mines reports preliminary figures showing the 1939 iron ore shipments in the United States at 54,825,000 gross tons, an increase of 107 percent over 1938 shipments, distributed between the various districts as shown in table at upper right.

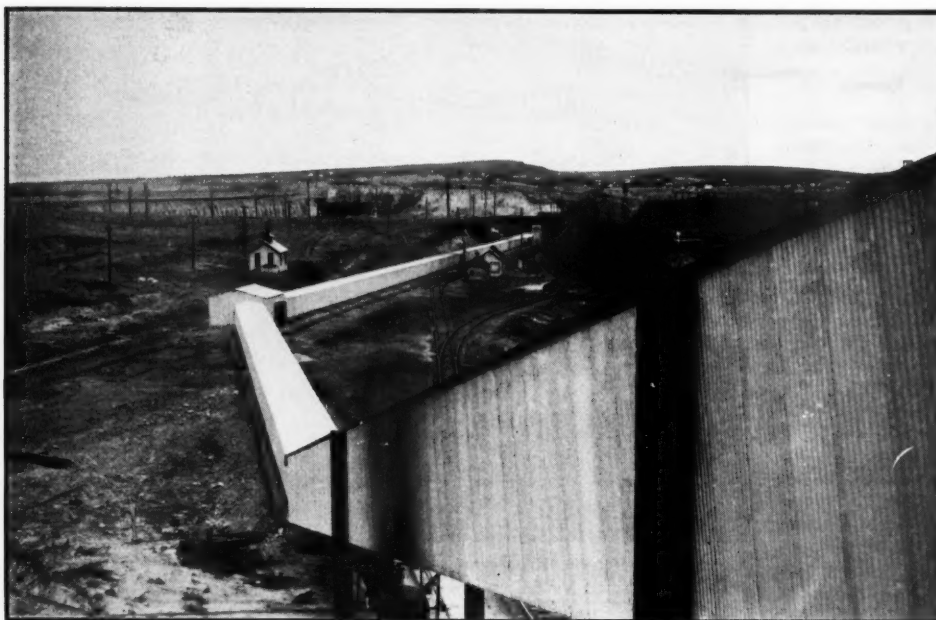
Late in the year attention was drawn anew to the old magnetite mining districts of the Eastern States, particularly New York, where Republic Steel Corporation further added to its interests by acquiring the property of the Chateaugay Ore and Iron Company at Lyon Mountain, in the northern Adirondacks.

Thus, Republic now controls the principal iron-ore properties in New York. At Mineville and Port Henry, the company expects soon to have in production the components of a new wet magnetic concentration plant with an estimated annual output of 600,000 tons of high-grade concentrates which will be shipped to its furnaces at Buffalo and elsewhere. From the Chateaugay property, which normally produces about half a million tons of high-grade low-phos. sinter, shipments are now moving to the company's Buffalo furnaces.

\* \* \*

It is apparent that rising costs of

District	Shipments Gross tons	Percent of total
Lake Superior:		
Michigan	11,237,000	20.5
Minnesota	32,393,000	59.1
Wisconsin	1,170,000	2.1
Total	44,800,000	81.7
Southeastern States:		
Alabama	5,969,000	10.9
Others	37,000	0.1
Total	6,006,000	11.0
Northeastern States:		
New Jersey	379,000	0.7
New York and Pennsylvania	2,724,000	4.9
Total	3,103,000	5.6
Western States	916,000	1.7
TOTAL	54,825,000	100.0



The long conveyor at the Spruce pit of Oliver Iron Mining Co. News is constantly received of other pits going over to this type of haulage

producing iron ore in the Lake Superior region, with gradual depletion and exhaustion of the higher grade ores, deepening of underground mines, heavy transportation expense and high taxes, together with increasing use of scrap in furnace operations, are gradually exerting their natural influence on

the economics of iron-ore production in the United States. Iron and steel makers facing keen competition, not only within their industry but between their products and other metals and non-metals, must continue to seek and to obtain their raw materials at the

lowest cost per unit of iron. This competition perhaps needs to be more fully recognized and reckoned with by all, including our public officials, who have an interest in the enterprises and communities devoted to producing this vital raw material—iron ore.

## COPPER Enjoys Good Year—

### Refinery Shipments Largest Since 1929

By **WALTER C. BENNETT**  
President  
Phelps Dodge Refining Corp.

**T**HE shipments of electrolytic copper from the United States refineries during 1939 were the largest for any year since 1929, the improvement being largely during the last quarter.

Mine production could not be accelerated with the same degree of rapidity as shipments, and domestic stocks of refined copper decreased sharply at the end of the year. Although war conditions in Europe and elsewhere had a material effect on the large consumption of copper, the im-

provement in general business undoubtedly was a contributing factor. In addition to the replenishment of inventory stocks, this improvement in general business in this country can be related to the expansion of facilities on the part of utility corporations, the increase in the number of automobiles produced, the increase in the construction of new homes, etc. The increase in the manufacture of new railroad equipment was another contributing factor noted during the year.

Sales of electrolytic copper during 1939, as reported by the principal sellers, totaled approximately 800,000 tons. During the first quarter the market had a downward tendency, and domestic sales were extremely light. During the latter part of March and continuing through the entire second quarter, sales were about equal to consumption. Early in the third quarter it became generally known that one of the foreign governments placed a substantial order for copper in this country for prompt shipment, which had a very stimulating effect on the market, and domestic demand quickened almost immediately. When the June copper statistics were published, show-

ing further decreases in both foreign and domestic stocks, the market developed a very firm tone. Domestic sales during July, 1939, reached a total of 180,000 tons, and it was during that month that the first price advance of the year took place. The market continued very strong through August, and, although the tonnage sold was not high, the domestic price was advanced to 10½¢ per pound during that month.

With the outbreak of the war in Europe on September 1, London Metal Exchange quotations were suspended, and the chairman of that organization announced that there would be no dealings in copper on the Exchange pending the outcome of negotiations with the British Government.

Domestic sales of copper during September totaled approximately 184,000 tons, and the price reached the highest level for the year, 12½¢.

Sales during the last quarter continued at a fair rate, and the year closed with all parts of the industry operating at a high rate.

The declaration of the European war caused a decided change in the flow and control of foreign copper. During the previous world war the supply of copper, to a very large ex-



Smelter, concentrator, powerhouse and shops at the Clarksdale Works (Arizona) of Phelps Dodge's United Verde Branch

tent, came from the Western Hemisphere, whereas at this time the productions of Canada and Rhodesia have been sufficient to entirely take care of the needs of Great Britain. The balance of the foreign production will have to seek world markets outside of the United Kingdom.

Up to the end of the year no weakness in the foreign price of copper has appeared, and it is apparent that for the duration of the war a very large tonnage of copper will be required.

During the first month of the new

year a considerable amount of uncertainty has developed, and this has been reflected in a decrease in new purchases. However, the production and consumption of refined copper have continued through January at a very high rate, and, although it is much too early to make any forecast for the year 1940, it would appear that for the first few months at least the consumption of both domestic and foreign copper will continue at a high rate and may continue for the duration of the war.

## Review and Status of LEAD



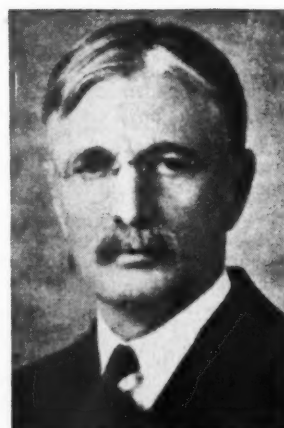
By CLINTON H. CRANE  
President  
St. Joseph Lead Co.

**F**ACED again with the disturbances brought about by a world war, the lead industry has had some troublesome problems. To complicate matters, reviving business in the United States had called for larger amounts of lead before the war started. Coupled with the excitement that affected all markets in September, the situation was not easy to cope with.

The lead industry is averse to swiftly rising prices, as it knows from bitter experience there is always an unpleasant aftermath. Producers desire to see that their customers can continue to operate on a satisfactory basis. Extraordinarily high prices for pig lead only mean a displacement of many uses for lead, which are difficult

to recapture after the activity is over. The lead industry, therefore, only showed a modest response in price to the record volume of business placed in September, which reached 104,000 tons of sales in that month as against 40,000 in July and 45,000 in August.

Sales, exclusive of those by secondary smelters, in October were 42,000 tons, 44,000 in November, and probably will not exceed 35,000 in December. The intake of primary smelters is running around 40,000 tons per month, so that although sales apparently are somewhat greater than intake, it is too early to predict whether the production and consumption in the industry are much out of balance.



The price, due to domestic demand, began to rise in July, and before the outbreak of the war reached 4.90 cents per pound, East St. Louis,



and then rose to 5.35 cents which, at that time, seemed high enough to bring in some ore lead if it were needed, and not too high to discourage domestic use. However, the price of lead outside the United States has been too high since the war started to allow ore lead to be sold in this market except when taking advantage of duty drawback, and if it develops that domestic demand is in excess of domestic supply, this price of foreign lead must control the domestic price once more. I have not altered my view that there is an excess of the world's needs being produced outside this country, and that when the shipping situation and the Allied control is further regularized, there will be ample lead for everybody.

Mine production (including some scrap lead) has been averaging about 40,000 tons per month against shipments during September, October, and November of 60,000 tons per month. A runaway market was avoided by drawing heavily on producers' stocks, so much so, that the year ended with only about 53,000 tons of refined pig lead on hand, about a month's supply at the present rate of consumption, compared with 115,000 at the beginning of the year. These statistics

place lead in an extremely strong position from the producers' standpoint, stronger as a matter of fact than the lead situation has been for years.

Higher prices for lead last summer and autumn brought out larger amounts of scrap to augment the ore supply from domestic mines. Scrap lead will furnish probably one-third more lead in 1939 than it did in 1938. At the year-end scrap receipts were expected to increase, as the shippers generally like to reduce their scrap inventories then.

#### Increased Demand Based on Business Revival

It is significant that the demand for lead has been predicated more upon the domestic revival of business than upon war needs because lead is no longer much of a factor in ammunition. It is the auxiliary, or everyday uses of lead, that make it useful for military purposes. If there should be no falling off in consumption, the mines will be hard pressed to meet the demand (imports may be anticipated), as the mines are running close to capacity today.

Mine production from strictly do-

mestic ores will probably be about 460,000 tons, which is the highest rate since 1930.

#### Marked Change in World Picture from 1914

On the international stage, the United States no longer occupies the position it did in 1914 when half the world's output of lead was derived from United States mines. In the current year, although complete figures are not yet available, it is quite likely that the United States will account for only one-quarter of the world's production. The British Empire has ample sources of lead from which to draw for its requirements—notably, Canada, Australia, and Burma, which together can easily produce 600,000 tons of lead a year. It is not to be expected, therefore, that the United States supply of lead will be drawn upon in meeting war demands abroad. Owing to the control by the British authorities, the London market has lost its ordinary significance.

In conclusion, the future of lead appears to depend more upon domestic business than foreign influences brought about by the war.

## What Next in the ZINC Industry?\*

By EDWARD H. SNYDER

General Manager  
Combined Metals Reduction Co.



TO the several thousand miners whose jobs and pay checks depend upon the price of zinc, to the "capital with courage" invested in zinc mines and reduction works, and to the executives and engineers whose jobs involve the problem of protecting both the miners and the capital, the perpetual title question is a serious one, and has been since early in 1930. It is also a serious one to the mining communities and the railroads, and we sincerely hope its importance to the nation as a whole will ultimately be recognized by those who now control our destinies in Washington.

\* Presented to Metal Mining Convention of The American Mining Congress, Western Division, Salt Lake City, Utah, August 28, 1939. Revised by the author to include last half of year.

Some facts relating to the past and present condition of the industry may assist in answering the question as to the future.

The domestic zinc industry during the nine long years from 1930 to 1938, inclusive, suffered the adjustment involved in absorbing an average weighted price decrease of 31.3 percent and at the same time a reduction of 31.5 percent in output, resulting in an average yearly gross income of only 47 percent of the average for the five years 1925 to 1929, inclusive.

During 1929, with the average London price 5.4 cents per pound, the foreign industry produced approximately 989,000 tons, which was the highest production ever obtained up to that time. In 1938, foreign produc-



tion totaled 1,274,000 tons for a new record high, with the average London price at 3.05 cents. The increase of 28.8 percent in production in the nine-year period was made in spite of an apparent average price decrease of 43.5 percent.

While domestic production decreased by 169,000 tons from approximately 625,000 tons in 1929 to 456,000 tons in 1938, foreign production increased 285,000 tons from 989,000 tons in 1929 to 1,274,000 tons in 1938.

### Reasons for Big Increase of Foreign Output

The average gross recoverable value of metals other than zinc in domestic zinc ores is less than half of that in the ores of Mexico, Canada, Australia, and India, and about 60 percent of the values of other metals in the ores of Poland, Spain, and Yugoslavia. In some cases, zinc has degenerated into a straight by-product metal in connection with the production of lead and the precious metals from high-grade complex ores. (See Minerals Yearbook of 1938, page 136.)

High-grade foreign ores coupled with cheap labor (except in Canada) are not the only reasons for the large increase in world production, while a large portion of the domestic industry was facing a slow death during the years 1930 to August, 1939. The so-called drives for self-sufficiency of metals involving subsidies of various types account for a substantial production of foreign zinc under conditions not controlled by the London price level, but by the abnormal demand for gold due to the shortage of foreign exchange in most nations except the British Empire and the United States.

Germany is the outstanding example of the nations that prior to the outbreak of the war in September, 1939, were driving for self-sufficiency and suffering from a shortage of foreign exchange. German zinc production increased from 56,000 short tons in 1933 to 180,000 in 1937 and 212,000 tons in 1938. The 1938 production was not quite four times that of 1933, and twice that of 1929.

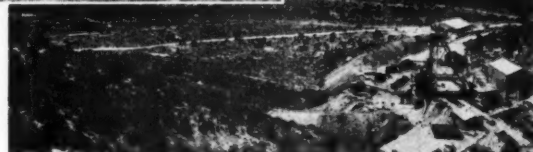
The European War II has increased further the abnormal demand for gold and dollar exchange.

### World Consumption

The world's apparent consumption of zinc outside the United States was 21 percent greater in 1938 than in 1929. The 1938 consumption is estimated at 1,196,000 short tons, excess production over consumption 77,000 tons, and stocks at smelters as of January 1, 1939, 300,000 tons. No accurate figures are available as to the quantities of concentrates on hand at mills and smelters on January 1, 1939,



Right—The new Casellon shaft of Combined Metals at Pioche. Power from Boulder Dam comes in from the left in distance



Left—No. 1 Shaft of Combined Metals Reduction Co. at Pioche, Nev.

but it is believed substantial additions were also made to concentrate stocks during 1938.

A large portion of the increase in foreign consumption prior to January 1, 1939, appears to be due to the metal used or stored for military purposes. No statistics have been published as to the quantities of zinc in the hands of governments or other consumers. Reliable opinion is that foreign consumers' stocks of zinc were large at the outbreak of the war.

All factors relating to the foreign zinc situation indicate that after restoration of peace, production of zinc outside the United States will continue

at an average price closely approximating 3.0 cents per pound London.

### Price Situation Analyzed

The average price differential between St. Louis and London for the first six months of 1939 was (4.5-2.89) 1.61 cents per pound, as compared to (6.76-6.46) a differential of 0.3 cent per pound for the five-year period 1925 to 1929, inclusive. The differential as of January 1, 1940, was 1.02 cents per pound (5.75-4.73) based on the pound sterling at \$4.00.

The duty on zinc was reduced 20 percent on January 1, 1939, from 1.75 cents per pound to 1.4 cents per pound for metal, and from 1.5 cents per pound to 1.2 cents per pound for zinc in ore.

In spite of the prevailing low price of 4.5 cents per pound St. Louis (2.89 cents London), foreign imports for the first six months of 1939 of zinc plus recoverable zinc content of ores totaled 21,720 tons, of which one-seventh came from Canada. During this period domestic stocks increased by 8,472 tons from 126,769 tons on January 1, 1939, to 135,241 tons on July 1, 1939. The foreign slab zinc entering domestic consumption during the first seven months of 1939 totaled 14,056 tons, as compared to 3,723 tons imported during the first seven months of 1938.

The London price of zinc increased to 3.03 cents per pound late in July. This plus a sharp increase in shipments in the domestic industry boosted the domestic price to 4.60 cents on July 27 and to 4.75 cents on August 7. United States stocks decreased by 3,459 tons in July from 135,241 tons July 1 to 131,782 tons on August 1. July was the first month since the tariff reduc-



Zinc operations in the Tri-State district, along with other producers, felt the severe effects of the zinc duty cut

tion was announced in November, 1938, that domestic stocks were reduced.

The accompanying tabulation shows stocks, production, and consumption of slab zinc in the United States for the last six months of 1939.

# STOCKS, PRODUCTION, AND CONSUMPTION OF SLAB ZINC IN THE U. S. FOR LAST SIX MONTHS OF 1939

	Stocks at beginning of month	Production	Domestic shipments
July .....	135,241	39,669	43,128
August .....	131,782	40,960	49,928
September .....	122,814	42,225	69,424
October .....	95,615	50,117	73,327
November .....	72,405	53,524	64,407
December .....	61,522	57,941	53,468
Total .....	284,436	353,682	
Average .....	47,406	58,947	

Stocks on hand January 1, 1940, totaled 65,995, representing an increase of 4,473 tons during December. Shipments during the last six months of 1939 exceeded production by 69,246 tons. The average production for the period was 47,406 tons, as compared to the average shipments of 58,947 tons.

## Zinc Imports Increased Notably

For the five months July to Novem-

ber, inclusive, in which statistics are available, zinc imports entered for domestic consumption in the form of slabs and ore totaled approximately 38,000 tons, as compared with 11,852 tons during the same period in 1938, representing an increase of approximately 212 percent.

The effect of the European War II on prices is shown in the following tabulation:

Date	St. Louis price prime western	London price prime western
Aug. 1.....	4.60c	3.03c
7.....	4.60@4.75c	3.03c
Sept. 2.....	5.00c	Arbitrary
5.....	5.65c	"
6.....	6.00c	"
11.....	6.25c	"
27.....	6.50c	"
Dec. 1.....	6.00c	"
18.....	6.00c	4.73c fixed
29.....	5.75c	4.73c "

The above statistics indicate the zinc industry had food, clothing, and shelter during the last half of 1939. It entered this period in a state of breakdown, with a substantial portion of the industry living on capital.

## Fundamental Problems Not Solved

The present temporary period of relief in the industry, due to the war in Europe, should not lead anyone to

believe the fundamental problems of the industry are solved, or that it can proceed with plans to perpetuate itself. The facts are to the contrary—summarized they are:

(1) Cheap foreign labor coupled with high-grade foreign ores can and will produce zinc under normal conditions in quantities in excess of consumption at a London price of 3.00c per pound or less.

(2) A large portion of the American zinc industry cannot produce zinc at a cost less than 5.50 cents per pound and at the same time maintain an American standard of living for its employees and obtain cost depletion on its investment.

(3) Cessation of the European War will result in the dumping of large quantities of war stock zinc on the world market, and force the American price below the cost of production.

The one satisfactory solution of the problem of the American zinc industry that can be had before a substantial portion of the industry is destroyed by foreign competition is a United States duty on zinc to maintain (with balanced production and consumption) an average domestic price above the cost of production, including the cost of development and depletion. A duty of 2.25 cents per pound is required. The industry's battle must continue until this duty is had.

# GOLD—Its Past and Future\*

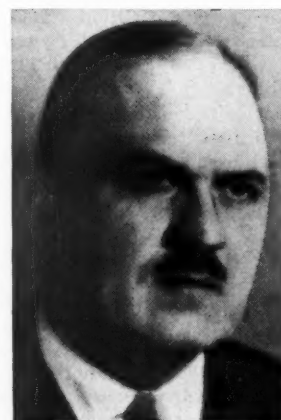
By MERRILL E. SHOUP

President  
The Golden Cycle Corporation

IT IS easier to review the past history of gold than to predict its future course. The 1938 gold production of the United States was 5,106,109 fine ounces, with a value based upon \$35 per fine ounce of \$178,713,815. The 1937 gold production was 4,834,062 fine ounces, with a value of \$169,192,182. The increased production in 1938 over 1937 was accounted for chiefly by Alaska, California, Idaho, Nevada, Oregon, South Dakota, South Carolina, Washington, and the Philippine Islands, which alone increased its production from 716,967

ounces in 1937 to 862,397 ounces in 1938.

Based upon preliminary figures, the gold production of the United States and Territories for 1939 (5,593,425 ounces) exceeded 1938 by 422,682 ounces—considerably more than the increase of 1938 over 1937 (366,203 ounces). The world outlook for 1939, in so far as production of gold is concerned, points to the same upward trend which has risen steadily from 19,317,961 ounces in 1929 to 37,109,391 ounces in 1938. For instance, preliminary figures indicate the 1939 gold output of South Africa amounted to 12,826,000 fine ounces, compared with 12,167,000 ounces in 1938.



The immediate future of gold, both world-wide and in the United States, insofar as its value and continued use as a medium of exchange is concerned,

\* Presented to Metal Mining Convention of The American Mining Congress, Western Division, Salt Lake City, Utah, August 28, 1939. Revised to include preliminary annual production figures.





The Golden Cycle Mill at Colorado Springs, Colo., with the Steep Front Range of the Rockies towering behind

and the maintenance by the Treasury of the United States of the \$35 per ounce price, is more difficult to predict. Since the \$35 price was made effective by the Treasury, our gold holdings have increased to the point where we now have more than one-half of the world's known supply. Since 1934 more than \$7,000,000,000 has been added to our gold stock. As our gold holdings have increased, those of other nations have correspondingly decreased.

The heavy additions to the United States gold stock, both from newly mined sources and importations during the past few years, have created considerable fear in the minds of economists and gold producers that the rest of the world might go completely off the gold standard and leave the United States as practically the only large nation remaining on it. This possibility has led to the advancement by economists and other well informed persons of various proposals relative to some form of legislative or executive action which Congress or the President of the United States, or both, should take to preserve and perpetuate the use of gold as the monetary standard of our nation.

Propositions which seem to have gathered considerable support are that the President or Congress, or both, should either take the steps necessary to again return into circulation the vast hoard of gold held in safekeeping by the United States Treasury, or else issue gold certificates in payment for newly mined gold produced in the United States and its territories.

In 1914 practically all nations of the world were on the gold standard, and had managed to stay on it for several decades. The use of gold as a

medium of exchange had become common throughout practically the entire civilized world, due to the fact that gold possessed qualities desirable for a monetary medium in a larger measure than any other known commodity.

Throughout the ages men had tried various commodities to facilitate and expedite the process of exchange. In the very early stages barter was used. In later stages, among numerous articles used as a medium of exchange were shells, beads, furs, grain, and various precious metals. Gold finally became the generally accepted medium of exchange due to the fact that it possessed more than any other commodity the necessary requisites for a satisfactory medium.

#### Requisites of Suitable Medium of Exchange

The chief requisites are a commodity in unfailing demand with wide acceptability existing in sufficiently large quantities to meet exchange needs, yet not so abundant as to lose its desirability; so durable that it will not lose its exchange power through decay or deterioration; can be divided into small units and used in transactions involving small or large amounts; is homogeneous and all parts or units have a uniform value and can be equally divided; is portable and possesses cognizability; has stability of value so that when contracts are made which involve the future payment of money both parties can have reasonable assurance that payments made in the future in gold will have the same absolute and relative position at the end of the contract as at the beginning. Gold possessed, and still possesses, more completely than

any other commodity these characteristics, and throughout the decades no other medium has been found which so fully satisfies these standards.

The above requisites were based on the proposition that gold would circulate freely, would pass readily from hand to hand, and never upon any idea that gold would be sterilized, buried in the ground, or used as a basis for managed currency. Gold has, in addition to its use as a medium of exchange, value in connection with use in the arts. Therefore, all of the above factors combine to make it the most all around satisfactory medium of exchange, and it has been accepted by mankind as the result of decades of experience.

#### Comments on International Barter

Today we hear considerable discussion about a return to the old days of absolute barter, particularly by such nations as Germany, etc., or the substitution of some other medium of exchange in the place of gold. Most of this talk comes from the leaders of the so-called "have not" nations. If they possessed enough gold to continue upon the gold basis, little barter talk would be heard. It is hard to believe that a medium which has been in use for more than twenty-six hundred years will ever be entirely replaced by some other medium of exchange. The long history of man's search for a satisfactory medium substantiates this.

The present world chaotic conditions cannot continue indefinitely. Sooner or later, order and stability will return and the other nations which have or had been on gold standards so many hundreds of years and may temporarily have abandoned it will return to the use of gold. The gold standard, when in force, is the strongest basis for international good will and trade, and the world must and will ultimately return to it.

It has been estimated that since 1492 there has been produced in the world more than 1,190,000,000 fine ounces of gold weighing approximately 41,000 tons, worth on the \$35 an ounce basis, approximately \$41,600,000,000; this huge stock has been accumulated through the ages because men believed in gold, based upon centuries of satisfactory experience, and had found it the most satisfactory medium of exchange.

#### Present Unbalanced Reserve Position Will Be Righted

Much of the gold which has come to the United States, particularly

since 1934, has been sent in, either by individuals or foreign nations, to be kept in safekeeping until the present world chaos has disappeared and become history. This gold will flow out of the United States to these nations when order and confidence have been restored, and the world gold distribution which existed prior to 1934 among nations will again be re-established on some new basis and gold again become the accepted world-wide medium of exchange.

As far as the immediate future of

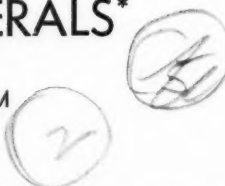
gold is concerned, insofar as its continued value and use as a medium of exchange, complex problems are presented which can produce a series of different answers. Probably no one in the world today can foretell what will happen, and one person's guess is as good as another's. It seems generally agreed that insofar as the United States is concerned the return of gold into circulation as an actual medium of exchange is a desirable thing. Just how this is to be accomplished, and with what methods,

is the problem to be determined.

The immediate future price of gold is something which no one can forecast with any assurance. One thing is certain, however—gold's value may change, but its acceptability will remain. Gold possesses all the desirable factors which a medium of exchange should possess, and will return to its proper place in the world's affairs as the most desirable and acceptable medium of exchange yet devised by man to carry on the nation's and the world's business.

## STRATEGIC MINERALS\*

By CHAS. H. SEGERSTROM  
President  
Nevada-Massachusetts Co.



IN ORDER that the subject of Strategic Minerals may be discussed with some degree of intelligence, it is necessary first to classify these minerals.

Modern wars are fought on so many fronts that any country engaged in war might consider all minerals and materials as strategic, also such other raw materials and supplies as are necessary for the armies as well as for the civilian population.

During the World War and in the present conflict in Europe, certain minerals, metals and materials have been classified as strategic, that is, they are vitally necessary for the maintenance of the army, navy and civil population, and greater emphasis has been applied toward those minerals or materials which are not found or produced in the country in a sufficient amount to supply their needs.

In the common "every day" use, the term "strategic" is limited to the more important requirements in munitions and industrial production, which relates directly to the promotion of war, and includes such minerals as iron, steel, manganese, copper, lead, zinc, tin, antimony, tungsten and a number of others of major importance.

In the United States these products have been carefully studied for years

by the War Department, and an official list has been compiled, including all raw materials which were deemed to be strategic from a military standpoint. This list includes those mineral products which in the opinion of the department, from past experience, are shown more likely to be deficient in supply under the conditions of war demand, and have been classed under the headings of Strategic Minerals and Critical Materials.

Among those classified as "Strategic" in the last official list of 1939 are included: aluminum, antimony, chromium, manganese, mercury, mica, tin and tungsten. I shall therefore confine my remarks to these minerals.

### MANGANESE

The consumption of manganese falls under two general headings—metallurgical and chemical. In metallurgical uses the great majority of manganese required goes into the manufacture of ordinary steel. A small percentage is used in production of special high manganese alloy steel, in foundry work and in other types of alloys. Manganese in steel manufacturing is used as a deoxidizer and desulphurizer. It is usually added to the mass in the form of ferro-manganese while the metal is being poured from the furnaces, and by combination with residual oxygen and sulphur in the bath, helps to produce a sound, clean metal.



Small amounts of manganese also improve the physical properties of steel, and a fraction of manganese is added and is present in the finished metal. The amount of manganese required for the various types of steel being made by the process used over a period of years, averages about 14 lbs. of manganese per ton of steel made.

There is no strictly military use for manganese, it is merely used in ordinary commercial steel plants which are increased in magnitude and importance in time of war.

Ores from which ferro-manganese can be made should have a minimum of 40 percent manganese and preferably more. Impurities to be considered in manganese ore are silica and phosphorus, and if they are present in amounts over 8 percent silica and 2.50 percent phosphorus, the ore is considered undesirable in metallurgical work. In recent years low grade ores have been worked by tabling and concentration. The United States Bureau of Mines has conducted experiments near Boulder Dam, where electro-chemical deposition of low grade

\* Presented to Metal Mining Convention of the American Mining Congress, Western Division, Salt Lake City, Utah, August 28, 1939. Revised by the author for inclusion in Annual Review Section.

manganese has proven very successful.

The manganese production in the United States prior to the World War was very small. Due to high prices and increased demand, production reached a maximum of 311,000 tons in 1918 under pressure of war demands.

In the years following the war, due to high costs and low prices for the material, also a reduction in the duty on manganese through a reciprocity treaty with foreign countries, the domestic production decreased, and for several years prior to 1939, the production was so small, it was scarcely worthy of note.

## MERCURY

Mercury is the only strategic mineral in which the United States has ever been a leading producer, and domestic production still contributes an average of two-thirds of the consumption and demand. During the war period the United States was practically self-supporting, as during the years 1915 to 1919 the exports of mercury exceeded the imports by more than 100,000 lb.

Mercury is a key metal in our munitions program through its use in explosives of all kinds. Mercury is not primarily a munitions metal, but as in the case of all other strategic minerals, it is primarily an industrial metal. Certain of its ordinary industrial uses are expanded by war demands.

In 1917 the total use of mercury in the munitions program required only 17 percent of the total mercury consumption in the United States. The other uses for mercury are varied and numerous.

Considerable mercury is used in the manufacture of various types of electrical apparatus. Mercury vapor lamps and rectifiers; contact and switching devices for electric signs, and it might be mentioned that approximately 1,000 different uses for mercury are listed.

At hearings before the United States Tariff Commission, evidence was produced that at \$90 per flask the entire domestic market could be satisfied from the domestic production. Emergency requirements would possibly exceed the probable supply, but the resulting deficit does not seem likely to be greater than could be reasonably expected to be covered by imports, economy and substitution. However, lacking future discoveries of ore bodies higher in grade than the pres-



Typifying the use of strategic metals for defense is the airplane, in which these metals find necessary application in strong, light alloys

ent average, mercury is largely destined to remain a strategic mineral from a general industrial standpoint, as well as a purely military standpoint.

## CHROMIUM

From a strategic standpoint, chromium has many points which are similar to that of manganese. The domestic output previous to the World War was practically nothing, and during the war period expanded to cover the demands during 1916 to 1918; after the close of the war, production dropped back to pre-war levels.

Chromium, as with manganese, is represented by moderate domestic ore reserves in the United States. The grade of this ore is too low to be economically operated at a profit in normal times. Chrome is used largely by the steel industry in the form of chromite, and as a refractory material in furnace linings.

Since the development of the so-called stainless steels, which carry up to 30 percent of chromium, its use in alloyed steel has increased. The development of electrical heating equipment in both household and industrial uses has multiplied the demand for chromium in this direction, and many new applications have similarly expanded its consumption as a heat resistant alloy.

The large bodies of ore, both of manganese and chromium are found in countries which have little or no local demand. Supplies of both chromium and manganese have been imported from comparatively remote sources. These sources are numerous and widely distributed, a score or more

countries having contributed to our supply.

Military uses of chromium are all directly connected with corresponding industrial uses. Chrome steel, on account of its hardness and toughness, is used in the production of armor plate and armor piercing projectiles, and a considerable use of stainless steel in naval construction. As a chemical, chromium is important in the tanning of leather for shoes and other items of military equipment. It is also important from a military standpoint for its use in the form of dyes. It is also used in many weapons and in tool steel, in combination with either nickel, iron or cobalt.

Of the United States, California has probably the largest amount of the ore, these deposits having produced 176,000 tons between the years 1916 and 1918.

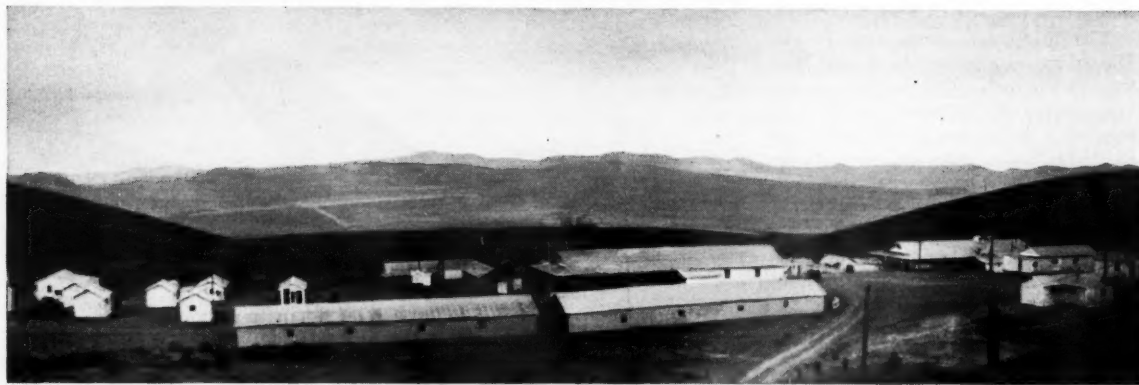
Chromite in the United States was first discovered in Maryland in 1810, and was used in the manufacture of yellow and green paint pigment. The total estimated production in the United States to date has been 290,000 metric tons.

The deposits are small and widely scattered and most of them can be worked only when the product commands an exceptionally high price. This accounts for the small production in normal times when prices are low.

## TUNGSTEN

Tungsten is used primarily in the steel industry, usually in the form of an alloy with iron, and as in the case of chromium and manganese, similar conditions are met with tungsten, but with this marked difference.





Camp at the Mill City, Nev., tungsten mine of Nevada-Massachusetts Company, overlooking the broad Humboldt Valley

The domestic tungsten industry has been much more nearly on a self-supporting basis, not only during the war period but in the preceding and succeeding years as well, with the exception of the immediate post-war years, when prices were so low that domestic production ceased entirely.

The United States is the only first rank steel producing country in the world that has tungsten resources within its boundaries sufficient to satisfy an appreciable amount of its needs. All other large steel producing countries must draw on remote sources for supply, while the United States has been able during the period since the war to furnish one-half of its requirements from domestic production, and during part of this time it supplied nearly two-thirds of its needs, which is a record that is outstanding. Only one other strategic mineral product, namely, mercury, has obtained a position comparable to this.

It has been estimated that the steel industry in the United States requires about one-fourth of a pound of tungsten for each ton of steel manufactured.

Largest use of tungsten is in the production of high speed tool steel. These steels have the property of retaining their hardness up to a red heat; therefore, they can be used at much higher speed and heavier cuts than ordinary tool steel. The tungsten in this steel ranges from 15 to 22 percent and a small amount of chromium and vanadium is added. The usual high speed tool analysis is 18 percent tungsten, 4 percent chromium and 1 percent vanadium.

Other types of steel using from 4 to 12 percent tungsten are used in self-hardening steel. Another important use for tungsten steel is in the manufacture of valves and valve seats

for automobile and airplane engines. This is due to the ability of this steel to retain its hardness at high temperatures and adds long life to the valves.

During recent years tungsten has been incorporated in small amounts in a number of other complex alloy steels, including stainless steel, also used in some form of tungsten steel, in car springs, railroad rails, sounding plates for pianos, grinding rolls, sheer cutting blades for hot metals, razor blades, knife blades, files, hacksaws, drills, watch springs, telephone conductors and transformer cores.

In a military way, the most important uses are the ordinary commercial applications which involve the production of military equipment of all kinds, such as the manufacture of guns and shells. It is estimated that one man with highspeed tungsten steel and one lathe can do the work of five men with ordinary tool steel and five lathes. This means that with the tungsten steel the shell production can be accelerated five times without any additional labor or equipment.

Tungsten alloy steels are also used as a core in small armor piercing projectiles and for large caliber projectiles of high penetrating power. It is also used in the manufacture of armor plates, as a corrosion resistant liner in heavy guns, and an alloy of tungsten and cobalt is used for guns in naval work.

In the United States active work in tungsten mining started soon after the discovery of highspeed steel. Shortly thereafter, the Atolia Mine in California was discovered, and for years this country held the leading position in tungsten production, and up to the present time the bulk of production in the United States has come from three states—California, Colorado and Nevada.

Tungsten is found in 11 other states in small amounts. It has been for this reason that tungsten alone, among the various minerals, stands in a class by itself in regard to production and requirements. There seems to be a sufficient reserve of tungsten in the United States which might justify the assumption that for a limited time at least, the industry could operate on a self-sustaining basis and provide sufficient tungsten for the United States' requirements, providing the price could be maintained at a sufficiently high level to cover operating costs of low grade properties.

## ANTIMONY

Antimony has more uses of direct military character than any other member of the strategic group, and possibly is more important for military uses than any other except mercury. The production of antimony in the United States has never been large, and even during the period of the World War, only a small production was maintained. The principal supplies to the United States and other countries have come from China, where Coolie labor is able to produce at such a low price that they have supplied three-fourths of the world's demand in normal times. During recent years antimony ore has been imported from Mexico and refined in Texas, the balance of our production having come as a byproduct from the smelters.

The specific military uses which make antimony of primary importance from a military standpoint, are such as shrapnel, balls and bullet cores of lead, which are hardened by a certain amount of antimony, and on bursting, this charge of shrapnel shells contains antimony sulphides, which produce a

dense smoke on explosion, and this enables the gunners to observe the location of the burst. This is the reason for its importance in military uses.

Antimony is found in several locations in the United States, and has been mined in small quantities but from our present knowledge there are no deposits of importance which could be worked unless the price was greatly increased.

#### TIN

A fundamental factor of all strategic minerals is that they are all not equably distributed between producing and consuming countries, and in no case is this more marked than with tin. Seventy-five percent of the world's production comes from a small area in Asia, while North America has furnished less than 2/100ths of 1 percent, and the United States, although it is the world's largest consumer, has practically no production at all, the entire recorded production of the whole continent of North America would satisfy our normal domestic consumption for only about a week.

The importance of tin in our industrial life is not generally recognized, probably because of the fact that the amount of tin the average person comes in contact with in every day life is small. Tin, industrially, is one of the most important of the non-ferrous group of strategic minerals, and although tin is not used directly in the production of steel, as in the case of most metals, its consumption is almost linked as closely to the steel industry as though it were used in steel.

The industrial uses for tin are minor compared to its metallurgical uses, which account for 94 percent of the consumption of new metal.

The outstanding use for tin is in the production of tin plate, which is mild steel covered with a layer of tin.

Tin has no specific military use, but war demand does increase the consumption of tin in many ordinary industrial uses.

#### NICKEL

Next to manganese, nickel is probably the most important metal in a modern munitions program, and is one of the few of which this country is entirely dependent on outside sources for its supply. There has been no direct production of nickel in the United States except a small output obtained in the refining of copper.

Nickel is used extensively in the steel industry, both in the form of a

metal and an alloy. Its metallurgical uses are so numerous that I can give you but a rough outline. Added to steel, it furnishes strength, ductility and toughness. It is used in all forms of equipment, such as shafts, gears and machine tools. And one of the increasing uses is in making monel metal, which contains approximately 67 percent nickel and 28 percent copper.

The military uses are identical with those of industry, but among the most important in military use is in armor plate in both naval and army uses, in the construction of gun forging, recoil springs and bullet jackets.

#### MICA

Mica is a mineral used exclusively in its original form and not for the extraction of a metal or a conversion of some other form of compound. The outstanding feature, from a strategic standpoint, is that while low grade mica is abundant and widely distributed, high grade mica is extremely limited in occurrence, and since most of the strategic uses require high grade type, the strategic position of mica in the United States is pronounced.

The chief uses for mica center around its high insulating properties, and probably 90 percent of the modern uses of sheet mica is in the electrical industry. One of the most important uses for mica is as separator leaves in electrical condensers. This use requires an exceptionally high grade mica absolutely without flaws. Recent developments of radio and of the internal combustion engine for airplanes and automobiles, have made an enormous increase for the demand for condensers.

There is no specific military use for mica, but war demand naturally increases the use of ordinary electrical equipment, and many military requirements are almost identical with the specific industrial requirements, as, for example, the radio sending and receiving sets, airplane spark plugs, motors and generators.

The production of sheet mica in the United States since 1913 produced about 26 percent of the domestic consumption, leaving about 74 percent to be supplied by imports.

#### ALUMINUM

Aluminum is the last of the strategic minerals which I shall discuss. It made its first appearance on the official list in 1932, and was transferred to the strategic list in 1936.

While the United States has extensive deposits of bauxite, the commercial ore of aluminum, demand for the metal has expanded so rapidly during recent years, that it has become advantageous to import some of the higher grade bauxite, of which large quantities have been developed in other countries. These imports began to assume material proportions in the early twenties, and now consumption is about evenly divided between imports and domestic production, while France is the leading producer of bauxite, the United States is second.

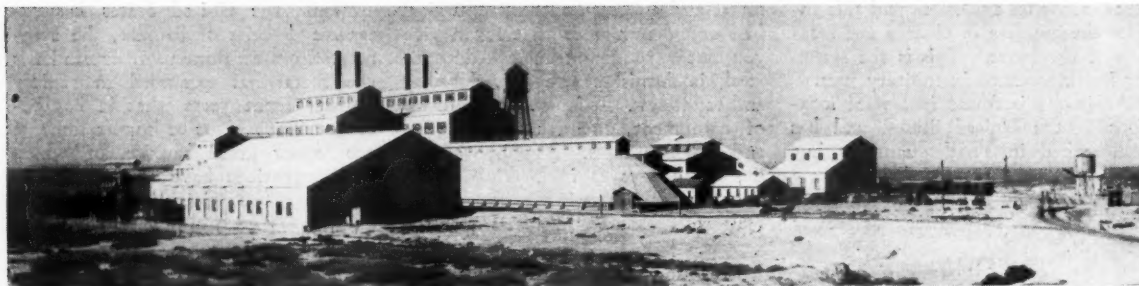
The military uses of aluminum—those specifically or exclusively of a military character—are few. Fundamentally, an aluminum mess kit is made in the shape and size to meet specific conditions, and since it is constantly carried in a soldier's pack, lightness is the primary consideration in the selection of material. The combination of lightness and strength are fundamental reasons for the selection of aluminum for most of its military uses, where light weight is of great importance. Manufacture of airplanes comprises perhaps the most important use of aluminum and alloys for military purposes.

With the completion of Boulder Dam, a great deal of experimental work has been carried on in the treatment of alunite for the recovery of potash and alumina by the United States Bureau of Mines. Large deposits of this material are known to exist within a comparatively short distance from the damsite.

#### CONCLUSIONS

In conclusion, I want to say that since strategic minerals are by definition those of which we have insufficient supplies, we should encourage their production and development as far as possible. In the past too large an amount of this material has gone down the tailrace and been lost. Now, as the result of experiments in flotation, magnetic separation and other processes, these metals and minerals are recovered. Metallurgists and chemists have made important discoveries, and research has shown the way to secure lower costs and better products.

It is now possible to work lower grade deposits that a few years ago could not be economically operated, and as a result, year by year the United States is becoming less dependent on foreign sources for our strategic minerals.



Refinery and warehouses of United States Potash Company near Carlsbad, N. Mex.

## POTASH and PHOSPHATE ROCK\*

By **BERTRAND L. JOHNSON**

Associate Mineral Economist  
Nonmetal Economics Division  
Bureau of Mines



**T**HE first 8 months of 1939 saw agriculture as the controlling factor in both potash and phosphate rock industries. Then war stepped in, striking at both industries, but in different ways, threatening a domestic shortage of supplies in one, a surplus in the other. The cash farm income of American farmers in 1939, including Government payments, is believed to have been a little over eight billion dollars, somewhat larger than in 1938 but not as high as in 1937. This higher income was reflected in increased fertilizer sales, and fertilizer tag sales for the reporting 17 states for the first 11 months of 1939 were about 4 percent above the corresponding period of 1938 and 8 percent below those of 1937. Consumption of fertilizer in the United States in 1939 is estimated by the National Fertilizer Association as about 7,700,000 tons, approximately 3 percent higher than in 1938. Increased domestic consumption of potash and phosphate rock appears to have accompanied this increased sale of fertilizer.

### POTASH

In the domestic potash industry total sales of potash ( $K_2O$ ) by the domestic potash-producing companies in 1939 are believed to have been greater than in 1938, and exports of potash-bearing fertilizer materials were larger than in any previous year. Imports of potash salts were less. Total

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deliveries of foreign and domestic potash to continental United States, Canada, Cuba, Hawaii and Puerto Rico were less in 1939 than in 1938 because of the extension of the discount delivery period to include January, 1940, instead of ending with December as heretofore, and because of the interruption of exports from Germany by the European war. Consumption of potash ( $K_2O$ ) in the United States in 1939, as estimated by the American Potash Institute, showed a slight increase over their estimate for 1938.

The principal potash producers in 1939 in the United States were the American Potash & Chemical Corporation, at Trona, Calif., and the United States Potash Co. and The Potash Co. of America, with mines near Carlsbad, N. Mex.

An additional potential producer of bedded potash salts from Government leased land, the Union Potash & Chemical Corporation, is expected to begin production in 1940. This company is controlled and managed by the International Agricultural Corporation, one of the largest domestic phosphate rock producers, with plants and mines in both Florida and Tennessee. The Union Potash & Chemical Corporation has developed a deposit of langbeinite, a potassium-magnesium sulfate, in the New Mexico field and will be the first company to market potassium sulfate direct from domestic ore in the United States. It has been estimated that the company will produce approximately 70,000 tons of potassium sulfate and

an equal amount of 60-percent muriate per year. In 1938 only 59,855 tons of potassium sulfate were imported into the United States, chiefly from Germany, and 13,158 tons of sulfate of potash-magnesia, also largely from Germany. The development of this new mine therefore can free the United States from the German monopoly of potassium sulfate.

On October 19, 1939, the United States Department of the Interior held an auction for the leasing of six parcels of potash-bearing public land at Searles Lake, Calif. There were but two bidders, the American Potash & Chemical Corporation and the West End Chemical Co. of San Bernardino, Calif. The former company was the higher bidder on four of the parcels, and the latter company on the other two. Later the Interior Department awarded to the American Potash & Chemical Corporation three leases. These are for a 20-year period and can be extended for 10-year periods thereafter at the discretion of the Secretary of the Interior.

Potash exports from the United States during 1939 were handled by the Potash Export Association, formed in 1938 by American potash-producing companies. After the outbreak of the European war in September 1939, however, this association decided to accept no new orders for exports of potash, with a view to conserving the domestic supply toward satisfaction of domestic needs. Exports of potassium fertilizer materials from the United States for the first 10 months of 1939 were larger than for any preceding entire year.

The European war broke up the International Potash Cartel, disrupted potash shipments to the United States, and was followed by the opening of offices, in New York City, of two new companies, one to import potash from France and the other to import German potash through neutral countries.

New price schedules for the 1939-40 fertilizer year were issued in June



1939 by both domestic producers and importers. The basic prices and discounts remained the same as in the previous fertilizer year and had not been changed up to the end of 1939. Muriate of potash continued to be quoted at 53½ cents per unit  $K_2O$  in bulk at the principal United States ports. In December 1939 plenty of domestic potash to meet current needs was reported. Stocks of sulfate of potash were reported low and sales curtailed.

The investigation of the fertilizer industry by the Department of Justice during the year included the potash industry, and charges of alleged violations of the antitrust laws (uniform pricing by the companies in individual areas) are said to have been presented to a Federal grand jury. Representatives of the leading domestic potash producers and importers held, during the latter part of the year, a series of conferences with the Department of Commerce with regard to these pending charges.

### PHOSPHATE ROCK

A little more phosphate rock appeared to have gone into the domestic production of superphosphate for fertilizer use in 1939 than in 1938. The total production of bulk superphosphate in the United States in the 12 months ended November 30, 1939, was 3,739,199 short tons compared with 3,676,365 tons in the corresponding period ended November 30, 1938. Production in October and November 1939 was sharply accelerated and was much above the corresponding months of 1938. Domestic consumption of phosphate rock for fertilizer purposes in 1939 appears, therefore, to have increased somewhat over 1938.

Mining of phosphate rock was carried on in Florida, Tennessee, Virginia, and the western states, as in previous years. Phosphate mining operations be-

gun in South Carolina in 1938 do not appear to have been resumed in 1939. Further increases in the demand for phosphate rock for chemical uses were indicated by developments during the year. The Victor Chemical Co. added two new electric furnaces to its plant at Mt. Pleasant, Tenn., and a nodulizing plant of capacity adequate to supply all three of its electric furnaces. A plant for the continuous oxidation of phosphorus to phosphoric acid was also built at Chicago Heights. Both the electric-furnace plant at Mt. Pleasant, Tenn., and the blast-furnace plant at Nashville, Tenn., for the production of elemental phosphorus, were in operation during the year.

Exports of phosphate rock from the United States in 1939 are expected to be less than a million tons and consequently less than in 1938. Both land pebble and high-grade hard-rock exports are expected to be below the 1938 figures. For the first 11 months of 1939 exports of both classes of phosphate rock were less than in the corresponding period for 1938, and it is believed that shipments in December 1939 will be less than in December 1938, owing to interruption of phosphate rock shipments to Germany by the British blockade.

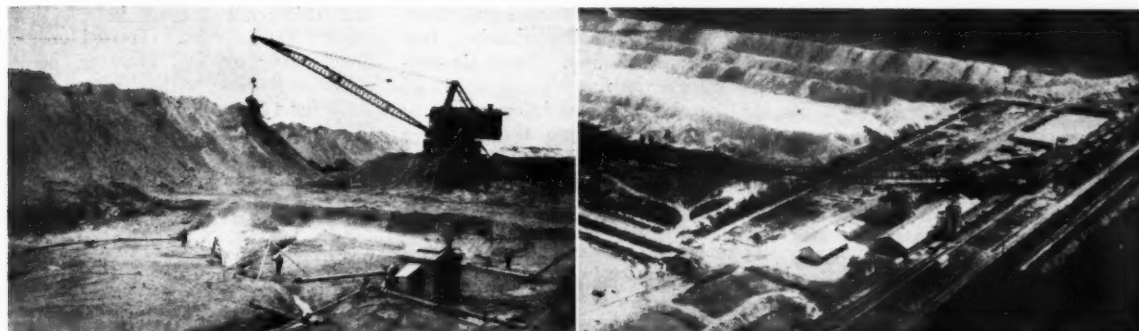
Government activities in connection with the domestic phosphate rock industry continued during 1939. The report (1,182 pages) of the hearings of the joint Senate and House Committee to investigate the adequacy and use of the phosphate resources of the United States pursuant to Public Resolution 112 was published early in the year. The estimates of reserves of phosphate rock in Tennessee as presented to the committee by the phosphate rock industry, totaling over five billion tons, largely phosphatic limestone, were critically reviewed during the year by G. I. Whitlatch of the Tennessee Division of Geology,

who concluded that the brown-rock reserves were essentially confirmed by other investigations, that no additional data were available to change the original estimates of blue rock, that the large white-rock reserves cannot be accepted without reservations, and that present data are too meager to warrant full acceptance of the estimate of 5,000,000,000 tons of highly phosphatic limestone. No critical review of the large Florida estimates is known to have appeared.

An investigation, however, was ordered in 1939 by the Secretary of the Interior as to the advisability of reserving to the United States the undeveloped phosphate rock deposits that occur in many portions of the public domain of Florida. More than 66,000 acres in 16 Florida counties are reported as already included in the Federal Phosphate Reserve. The possibilities of additional workable deposits are to be determined before the land is disposed of under the present public land laws.

Just before Congress adjourned in August 1939 the phosphate investigation committee was granted \$5,000 to complete its work of determining the extent of domestic phosphate rock and related minerals, the report to be submitted by January 15, 1940.

The TVA operated three electric furnaces during the year ended June 30, 1939, virtually completed the construction of a new furnace of different design, and partly constructed an improved metaphosphate plant. The Authority produced 4,600 tons of calcium metaphosphate and 69,000 tons of concentrated superphosphate. The TVA fertilizers were tested by land-grant colleges in 40 states, by the United States Department of Agriculture in three additional states, and on 25,700 farms. Over 50,000 tons of TVA concentrated fertilizer were also distributed by the Agricultural Adjustment Administration.



San Gully mine and plant of Southern Phosphate Corporation near Lakeland, Fla. Large dragline at left excavates 700 yds. of overburden per hour, while two hydraulic guns excavate 350 yds. of matrix per hour. Washing and recovery plant at right handles capacity of 1,800 tons of phosphate rock daily

# SULFUR in 1939\*

By ROBERT H. RIDGWAY

Mineral Economist  
Metal Economics Division  
U. S. Bureau of Mines

THE last quarter of 1939 witnessed unprecedented expansion in industrial production. This improvement in general business conditions, which coincided with the outbreak of war in Europe, was felt in the chemical industry with a resultant demand for sulfur. Aside from its direct effect on our export trade in sulfur, the advent of war in Europe not only created foreign demands in this country for products formerly supplied by European nations but also disturbed, in some instances severely, the flow to this country of processed material requiring sulfur in its manufacture. This deficiency was supplied with materials of domestic manufacture, and a demand for domestic raw materials resulted. Noteworthy in this connection was the stoppage of supplies of salt cake from Europe. Further, the inventory position in some commodities was low and the threat of restricted imports and higher prices stimulated buying; in consequence, operations in some industries approached capacity, thereby adding to demand for sulfur. The outbreak of war in Europe found the paper industry with low inventories. The possibility of reduced imports and of increased prices caused heavy buying; as a result domestic paper operations approached capacity production with larger demands for sulfur. The situation, however, was a little easier at the end of the year.

## Shipments Third Largest of Record

Coming as it did near the end of the year, the industrial rise was reflected to a greater extent in the rate of shipment of sulfur than in the rate of production. This was due partly to large producers' stocks and partly to the method of sulfur extraction which is not readily susceptible to change conforming to the market

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Operations of Freeport Sulphur Co.  
Above—Plant at Hoskins Mound, near Freeport, Tex. Vats of sulfur in distance  
Left—Loading sulfur on barge at Port Sulphur, La.

pattern. Thus, shipments, which have been estimated at 2,170,000 long tons in 1939, recorded a 33 percent increase over 1938 and were the third largest of record, exceeded only by the record 1937 figure of 2,466,512 tons and the 1929 figure of 2,437,238 tons.

Although shipments in 1939 increased one-third over those in 1938, production dropped 12 percent to about 2,100,000 long tons. For the first time since 1935 shipments from the mines exceeded production, but only in a small way. Domestic output during the first three quarters of 1939 was 19 percent below the same period in 1938, but there was a pick-up during the last quarter, when output exceeded the 1938 figure by 25 percent. The bulk of the output and shipments in 1939 came from Louisiana and Texas, but there was a small production in California.

## Sizable Export Increase

The world markets for sulfur are supplied largely from American and

Italian mines, with the former the larger factor. Although exports of American crude sulfur were up only slightly in 1939, an increase in our foreign business followed the outbreak of the war. Eleven months' figures of exports of crude sulfur from Gulf mines reveal an increase of 5 percent over 1938 to 565,914 long tons. Movement was slow during the first half of the year but there was a substantial rise during the latter months, and shipments abroad in October totaled 91,986 tons. Treated or refined sulfur exports, however, made a sizable increase with the 11-month total for 1939 amount to 45,249,703 lb., 73 percent above 1938. Canada and Australia were strong market points, and there was a large movement of refined sulfur to Greece in 1939. Exports to Germany, formerly a large market, dwindled to 8,702 tons in the first 11 months of 1939.

## Changes in Industrial Outlets

Changes in chemical processes and products, the result of constant search



ROBERT H. RIDGWAY

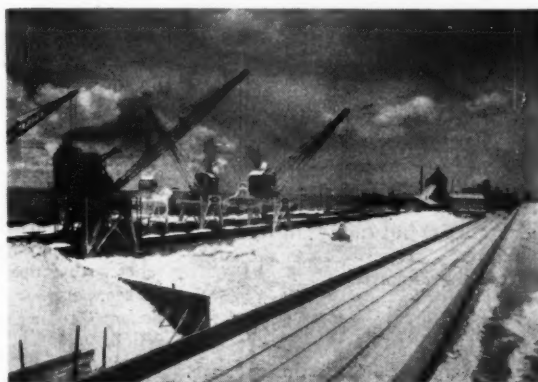
for improvement, are not without effect on the sulfur industry. Some developments tend to reduce or even eliminate the use of sulfuric acid, but other processes inaugurate new fields or increase use in older applications. New methods for the production of phosphate fertilizers, while not commercial as yet, seek to eliminate the use of acid. In late years the application of solvent methods in refining in the petroleum industry has reduced the use of sulfuric acid for this purpose, but more recently the development of other processes for manufacture of motor fuels may permit sulfur to regain, in part at least, its former position. During the last year the alkylation process for making high-

octane aviation fuels from gases formerly wasted at petroleum refineries has been making remarkable progress. This process, which uses sulfuric acid as a catalytic agent, may be installed in such capacity as will add significantly to the sulfuric acid requirements of the petroleum industry. On the other hand, through the application of reversible absorbents, the hydrogen sulfide removed in the purification of oil refinery products is recovered and converted to sulfuric acid. In the paper industry part of the sodium sulfate requirements are now being met by "synthetic salt cake" made from alkali and sulfur.

The quoted price of brimstone remained stable at \$16 per long ton, f.o.b. mines, during 1939. In connection with its studies on the concentration of economic power, the Temporary National Economic Committee held hearings on the sulfur industry on March 14, 1939.

Native sulfur has long been in competition with pyrites as a raw material in the manufacture of sulfuric acid, and although this country pro-

duces sulfur in excess of domestic requirements a considerable tonnage of imported pyrites is used. In the past the bulk of this movement has come from Spain with only a relatively minor movement from Canada. Striking in 1939, therefore, was the large increase in pyrites imports from Canada. For the first 11 months total imports were 450,113 long tons compared with 313,493 tons in the same period in 1938. Of the 1939 figure, 163,907 tons (36 percent) came from Canada compared with only 30,064 tons for all of 1938. Canadian output comes from the Eustis and Aldermac mines in Quebec



A Texas-Gulf Sulphur Company loading dock on the Gulf Coast

and the Britannia mine in British Columbia.

## Changing Aspects of WORLD MINERAL SITUATION\*

IN THE light of world events during 1939, it is apparent that among nations the inequitable distribution by nature of mineral resources is not a problem of mere academic interest. Was the lack by Germany of adequate mineral raw materials an irritant partly responsible for the outbreak of hostilities in September 1939? Will the status of all warring nations with respect to their self-sufficiency in raw materials have any major influence on the ultimate outcome of the several conflicts? Finally, will the question of political control of mineralized areas play an important role in the

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By JOSEPH S. McGRATH  
Chief, Foreign Minerals Division  
Bureau of Mines

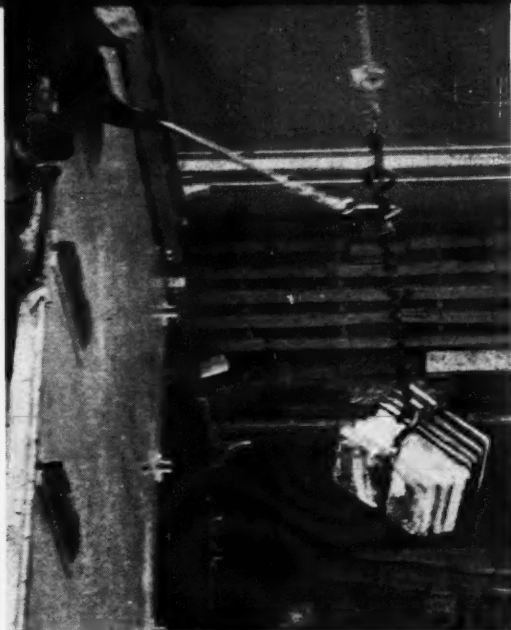
final peace settlements? Obviously no arbitrary answers can be made to any of these questions, but a brief analysis of known facts may indicate the gravity of the basic problem.

Before the annexation of Czech and Polish territory, Germany was largely or wholly deficient in at least 15 minerals that are essential to the nation's peace-time economic prosperity but are now of vital importance to war-time industry. Of these minerals the most important are iron ore and all of the ferroalloying ores, petroleum

products, copper, bauxite, tin, nickel, mercury, and a few nonmetals. The relatively small deficiency of zinc has disappeared now with the Polish sources controlled, but the territory acquired by Germany, including Austria, has not relieved the situation materially with respect to the aforementioned 15 minerals. As conditions obtain at the outset of 1940, Germany has potential exportable surpluses of only coal, magnesite, potash, and probably zinc.

The economic significance of Ger-





Unloading copper—a metal of vital importance in military and naval affairs

1,125,000 metric tons. Other sources from which Germany has been purchasing comparatively small tonnages of iron ore are Luxemburg, Newfoundland, Norway, Spain, and North Africa.

### Serious Lack of Iron Ore and Petroleum

Germany's pre-war output of iron ore, including uneconomic extraction of low-grade ores, represented about one-third of the tonnage imported. Swedish ores now appear to be of vital importance to Germany, with France no longer a source of supply. However, the entire output of Sweden, which in 1938 amounted to 13,928,000 metric tons, was only 63 percent of Germany's total imports. If the rate of imports evident during the first six months of 1939 was maintained throughout the year and represents actual need, it appears doubtful that export surpluses of other neighboring countries can supply the deficit.

With respect to petroleum products, Germany is a minor producer of natural crude petroleum. However, its output of synthetic oil from coal immediately before the outbreak of hostilities had reached a point where more than one-third of domestic requirements could be supplied from this source. Although crude oil has been imported for refining (principally from Venezuela, the United States, and Mexico), the principal petroleum imports are in the form of gasoline and motor oil. Of the total 11,500,000 barrels of gasoline imported in 1938, Netherland West Indies supplied 30 percent, Rumania 24 percent, the United States 19 percent, Netherland Indies 11 percent, and other sources the remainder.

During the first six months of 1939 total imports of 4,901,000 barrels originated in the same sources. Of the 10,640,000 barrels of motor fuel imported in 1938 the United States supplied 38 percent, Netherland West Indies 33 percent, Mexico 9 percent, Iran 8 percent, Rumania 4 percent, and other countries the remainder. During the first six months of 1939 these countries supplied Germany with 5,885,000 barrels of motor oil.

Considering the trade restrictions on world movement of materials essential to national defense invoked not only by belligerents but by neutrals as well since September 1939, Rumania appears to be the most accessible source of supply for essential petroleum products. However, as in the case of Swedish iron ore, Rumania's total exports of gasoline (which in 1938 were 13,484,000 barrels) barely would furnish Germany's peace-time requirements, as indicated by her total imports in 1938 of 11,500,000 barrels. In the last few months Germany's requirements of petroleum products unquestionably have increased considerably, and it is doubtful whether Rumania has been able to increase materially her output or exports in view of the recent decline in petroleum production and the fact that about 90 percent of Rumania's output of oil is controlled by foreign companies, none of which are German. It appears unlikely that Rumania can be depended on to supply any serious shortage that may occur in Germany, even if the entire output was available.

Considering the transport difficulties involved and the facts that internal demand has increased so rapidly in recent years that there is virtually no exportable surplus and that planned drilling operations were behind schedule in recent months, it seems apparent that large supplies of Russian oil for Germany are unlikely to materialize in the near future.

### Japan Also Depends Heavily on Imports

Japan is another example of a nation that has developed industrially without adequate domestic resources of raw materials to justify such rapid development. The Japanese iron and steel industry depends on Burma, Australia, or elsewhere for its high-grade iron ore and on the United States chiefly for essential scrap iron and steel. Likewise the United States in 1938 supplied Japan with over 90 percent of its copper imports, over 65 percent of petroleum products imported, and over 45 percent of pig lead.

Since no nation has an ample supply of minerals essential to modern industry, it seems evident today that national self-sufficiency in the raw materials necessary for industrial advancement, considered in the light of planned economy, is fraught with international complications.

many's dependence on imports of these industrial minerals is a topic much discussed in connection with territorial claims, but today this subject is of interest primarily from the angle of strategic implications.

### German Imports Analyzed

It is impossible to estimate with any degree of accuracy the stockpiles accumulated by Germany in recent years. Some idea, however, may be gleaned from the fact that imports in 1938 compared with 1932 increased 535 percent in iron ores, 490 percent in bauxite, 314 percent in chromite, 299 percent in manganese ore, 109 percent in copper, 186 percent in crude petroleum, 25 percent in gasoline, and 274 percent in motor oil. Figures for the first six months of 1939 compared with the same period of 1938, show an increase in imports of over 4 percent in iron ore, 13 percent in bauxite, 64 percent in chromite, 54 percent in crude petroleum, 12 percent in gasoline, and 34 percent in motor oil; slight decreases occurred in the imports of manganese ore and copper. The problem with reference to potential deficiencies of iron ore and petroleum products appears to be the most pressing. Imports of iron ore into Germany during 1938 totaled 21,928,000 metric tons; of this total Germany purchased 41 percent from Sweden, and 23 percent originated in France. During the first six months of 1939 Sweden furnished 43 percent and France 18 percent of Germany's total imports of iron ore. Total imports into Germany during the first six months of 1939 amounted to

2

# Notes on SLUSHER ROPES

By JOHN J. FITZGERALD  
Mechanical Engineer

Electric hoist  
scraping iron  
ore from sub  
to cars on the  
Gogebic Range.  
Slushing had  
its early de-  
velopment in  
the Michigan  
iron mines



THE mine superintendent who uses slusher ropes to any considerable extent is likely to find them coming quite often to his attention. They figure in a good many delays and, still worse, in accidents.

The work that is thrown on slusher ropes is hard work—made so by conditions that cannot well be changed. Mineral deposits play many tricks. Ore bodies do not ordinarily occur in such form that they can be worked to best advantage. The well-known “human element” plays an important part in disturbing the best laid plans. Steady production demands, however, that slusher ropes go along just the same.

The modern hoist on which the average slusher rope is operated is necessarily a very compact piece of equipment. Hoist designers struggle with the difficult problems that come with each new attempt to reduce size and weight, and to increase the general “workability” of their machines. The main concern of these designers is, naturally, to produce small, practical, efficient, fool-proof, light-weight, correctly-speeded, easily maintained, easily repaired hoists that will fit suitably into a wide range of mining conditions. Their work, like mining itself, involves many compromises. By and large they have done a good job.

If these men did not have to meet many of the requirements imposed by

special conditions they could design ideal equipment. They could arrange for liberal ratios between rope and drum diameters, for example—and could provide hoists which would perform perfectly—in a laboratory. But hoists work in mines—not laboratories.

## Ropes for Slushing Must Meet Extremes in Service

It is just in the nature of things that wire rope should take a beating at every slusher operation. There is always excessive abrasion and every reason for considerable distortion and kinking. A wire rope which is capable of operating under such conditions with any degree of success must of necessity be a compromise—in order that it may incorporate properties which will satisfactorily resist contradictory forces.

Some years ago the claims made for the preformed wire rope attracted the attention of miners everywhere. Having faith in the judgment and veracity of rope engineers many preformed ropes were introduced to slusher service.

In the matter of practical tests the ideas of the laboratory research man are of extreme value. Such men are not satisfied with test results unless they definitely control or average the conditions that influence the results. In mining, no one can expect such a

thing as perfectly controlled conditions—so, in evaluating equipment of any kind, final acceptance can be predicated on only the practical workaday average of many trials. The justified opinion of many miners is that the only really correct way of testing a slusher rope would be to use one kind steadily and exclusively for a number of years, and then to take other kinds in turn for equal periods. The fly in the ointment here, however, is that by the time the whole gamut of tests have been run, the first manufacturers are back with improved products and new sets of claims. All of which is part of progress.

## Operating Conditions Vary Widely

All kinds of rope have been used for slusher hoists. But in evaluating the performance of these ropes we must keep in mind widely varying operating conditions that obtain in various mines and which influence the behavior of all ropes.

We know that fleet angles must come as the circumstances of each setup dictate. To make a practical mining setup we must often lay out the placing of equipment in such a way that a bad fleeting condition cannot be avoided. This means that ropes will pile up unevenly on small diameter drums. Rope cross sections will be deformed. Individual wires will be torn from their assigned positions. This is especially true in the case of new ropes, due to the intermeshing of outer wires of contacting rope wraps.

Heavy abrasion on the ropes must be expected. There is a lot of siwashing, involving heavy and constant rubbing against any objects that happen, of necessity, to be so placed that abrasive rubbing cannot be avoided. Rock falls and improper sheave deflections cause wearing action on the ropes. Sheaves can often become so badly jammed that they do not turn. All of which wears out ropes.

#### Sheave Considerations

Then we come to looking at the sheaves in a critical way. Naturally, they are smaller than they should be for ideal rope operation. But this is mining—not creating ideal conditions for rope operations. So the sheaves necessarily are small. These small sheaves and such obstructions as the running rope may encounter can put permanent curls and kinks in the rope.

These things aggravate the unfavorable winding conditions on the drum. Small sheaves, of course, fatigue ropes rapidly—so, in considering the requirement that the rope materials be tough, we must also depend on the rope manufacturer to give us ropes which are not too hard, brittle or easily fatigued. Preformed ropes have been found to have greater resistance to fatigue, curling and kinking.

Many operations have followed the practice of making their own blocks at the mine. More and more miners, however, are finding themselves better off by using blocks bought from a qualified manufacturer. Sheave manufacturers understand the operating conditions. They know that when a slusher rope breaks, men don't want

to sit down and make a proper splice. The miners will tie the broken ends into a square knot and let it go at that. But this square knot has to clear the shell of the sheave—otherwise there is a lot of trouble. The sheave manufacturer knows this as well as operators do—and the chances are, he is better equipped than the operator at the mine to take this condition into consideration. Ordinarily it is both practical and profitable to buy sheaves rather than to have them made in mine shops.

Obviously the practice of tying broken slusher rope ends into square knots can be performed much more easily and safely when the rope is lim-

preformed rope. The strands of a preformed rope do not unlay or "explode" when breakage occurs. There is much more rope salvage after a break with preformed rope than there could be with ordinary rope. More important still—preformed rope pronouncedly reduces the direct injuries and later infections which miners suffer due to the wild, uncontrollable wires from both broken ends threshed around in an unpredictable way after a break.

Entirely aside from considerations of general economy, preformed rope is repeatedly proving itself safer for men to use. It is well worth mentioning that the "infection rate" at several



Sheaves used in slushing are generally small, and rope breaks frequently are repaired temporarily by tying into square knots—much more easily accomplished with preformed rope. Note large blocks of iron ore successfully handled by this scraper in a Michigan mine

ber and flexible. Preformed rope is by far the most satisfactory in this respect. There are also several other important practical advantages in the

mines has gone down sharply in the last few years. This period coincides with the increasingly general use of preformed slusher ropes.

#### Study Feasibility of Steel Industry in Northwest

Feasibility of establishing an iron reduction and steel industry in the Pacific Northwest is being studied by the Bonneville Power Administration, Paul J. Raver, Administrator, recently reported to Secretary of the Interior Harold L. Ickes.

A report, giving an evaluation of the basic factors that determine the possibility for such an industry to locate in the area, will be ready for submission to the Secretary within a short time, he said.

"The steel industry is one of many which might well manifest interest in untouched mineral resources of the Columbia River basin," Dr. Raver said. "The abundance of low cost power from such plants as Bonneville and Grand Coulee should make the region doubly attractive.

"Ultimately, availability of steel capacity in the Columbia River area would have a marked effect upon growth of industry and an upward trend in general prosperity of the region, although extent of this growth is difficult to evaluate at the present time."

The Administrator said the analysis by the Bonneville Power organization would point out by means of maps the approximate location of various raw materials, such as iron ore, coal, limestone, and refractories necessary for successful steel operation.

In addition, such other factors as technology peculiarly applicable to raw materials and markets available to a Columbia Basin plant will be discussed in detail in the report being prepared by the market development section of the Bonneville Power Administration.

The report also will sum up recom-

mendations by other agencies, such as the Army engineers, United States Bureau of Mines and Geological Survey, as well as local and state groups which made surveys of the region before the advent of Bonneville and Grand Coulee power facilities.

Presumably the report will also include an exhaustive analysis of whether or not the present and probable future markets for steel in that area will support such an industry—a factor that would appear more fundamental than the mere availability of raw materials for the industry.

One-fifth of the area of Utah is underlaid with coal. Federal estimates place its unmined reserve at 196 billion tons. At present consumption rate, Utah could supply American coal needs for more than 200 years.



# Prospector —

His face a blend of grey and red,  
Was as the rock he fought and bled.  
His hair streaked white and dusty dull,  
Long bearded and gaunt of skull,  
Shoulders stooped, and slow of walk,  
I saw him old until he'd talk.



And then small, deep-set eyes would flash,  
Turn grey and wicked, bold and rash,  
He'd spin tall tales you'd take for true,  
Of men and storms and things that grew  
And quickened under scorching sun,  
Or hidden gold he'd almost won.

He lived alone with pick and pan,  
With steaming food in old tin can,  
A bed of pine on jagged rock,  
A patch in pants, a hole in sock,  
And staked to grub on his own tale,  
That gold was there, he could not fail.

—Nancy Finch





# The March of COAL MINING

Ten Years of Progress

## ADVANCES IN OPERATING EFFICIENCY

By G. B. SOUTHWARD  
Mechanization Engineer  
American Mining Congress

**T**HIS is not to be a history. Many things have happened in coal mining during the past ten years, but as all of us are familiar with this progress, it is hardly necessary to make a review of what has been done. However, during this period many things have been learned, and by analyzing the developments that have taken place, we should be able to reach some conclusion as to which of these are based on sound fundamentals that indicate their continuance, and which ones are apt to be radically modified or discarded. This is, of course, a large order, but, with the help of operating men and manufacturers, it can be done—so we're going ahead.

### Charts and Graphs

The important step in an undertaking of this kind is to decide how to do it, and the possibility of graphs immediately suggests itself—plotting a curve of past results and projecting this curve to form a forecast of the future. Mathematically, there is no fault to find with this method; the principal objection to it lies in the fact that coal mining has not been governed by the laws of mathematics, and unforeseen happenings have upset the workings of many a theory.

Aside from this unorthodox behavior, coal mining is a combination of a number of operations, each one complicated by various factors, so that it would be difficult to select the basis for a curve that could be relied upon to show us what we want to know. Certainly no single type of equipment, no method of mining, nor the experience of any one field, could be taken as being truly representative; the different practices developed in cutting, blasting, loading, hauling, cleaning, would all have to come into the story. Then, for each of these operations, we would have to include, in addition to methods that have become accepted practices, those that were tried but failed.

The accompanying illustration shows what a graph would be apt to look like if we were able to chart all of the various lines of development that coal mining has followed over the past 10 years. Needless to say, this is entirely an imaginary picture, except in one respect—namely, that the direction of the median, representing the general progress of the industry, is steadily upward. But we do not need to plot a curve to tell us that.

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This is the introduction to a series of articles by G. B. Southward that will appear monthly, describing developments which have been made in mining, and analyzing the factors that have contributed toward higher operating efficiency.

Subsequent articles will present detailed accounts of the development of correct practices.

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### A Survey of Progress

Discarding, therefore, the idea of charts and graphs, the alternative method which can be used for analyses and forecast is to make a more or less detailed examination of what has actually been accomplished by various methods and equipment, and see where the trends are leading. The groundwork for such analyses already exists in the records compiled more than 10 years ago by the American Mining Congress in its Mechanization Survey. In the course of that survey, mine examinations and reports were made on what was then being done in the adoption of new machines, and, if we start from those original records and follow through the various steps made by some of these operations to reach their present efficiency, we shall discover and bring out many valuable points.

Particularly, if in addition to what has been done, we find out the reasons why.

The 1930's mark a distinct period in coal mining—the replacement of hand loading by machines. Prior to the beginning of that decade, there had been numerous experiments—manufacturing and operating—with conveyors and mechanical loaders, and by 1930 two things had been proven. First, that mechanized loading was practicable over a wide range of mining conditions. Second, that before these machines could be economically successful, however, every operation underground would have to undergo some revision, because hand loading practices would not fit into any plan of complete mechanization. This put the issue squarely up to the operating men, and their solutions to the numerous problems which arose have made the foundation on which future developments will be built.

### Problems of Mechanization

So much for generalities; now to get down to cases and see what some of these difficulties were.

In the early operations of mechanical loading, it became apparent that service haulage was an extremely important link in the chain, and the question of "car change" behind the machine came in for lots of attention. Dozens of different schemes were tried, ranging from complicated track and switching arrangements to special equipment such as surge hoppers and long loading booms under which several cars could be spotted at one time. As usually happens, however, the simplest solution to this problem proved to be the best—large cars, good track and adequate switching facilities, with rubber-tired service haulage recently entering the picture.

While these car change developments were going on, one important phase was being overlooked (and, in some mines, is still being overlooked)—namely, the delivery of trips to the service haulage. Lack of trip scheduling and wrecks due to bad track frequently caused more delay than was caused through car changing. It seems hard to believe, but time studies taken not so long ago show as much as 60 minutes lost during a shift, waiting on cars to be delivered by the main line locomotives. This record, incidentally, is an average of several machines over a 30-day period, so that it is easy to imagine what some of the individual days must have been.

Then there was the question of machine maintenance—and may it be stated at the outset that the majority of the delays due to mechanical breakdowns could not be laid at the door of the manufacturer. He was doing his best, but he could not buck against improper use, bad track, worn cables and lack of repairs or inspection. Neither could he be held responsible for low power caused by inadequate substation capacity, small trolley lines, loose bonding, and in some cases, no bonding; all of which contributed to the difficulties of keeping the equipment in working condition. A book could be written on this subject, but the point can be illustrated by one record of some years ago, selected at random, which shows an average over a 30-day period of 48 minutes delay per shift for mechanical failures.

Conveyors have also taken their share of punishment. This equipment

is built for hard usage, but not as hard as it was subjected to. Delays caused by misalignment, refuse blocking the return flights, lack of maintenance and power troubles were all considered necessary evils. And, as in the case of mechanical loading, a record of three consecutive months for several conveyor units shows 40 minutes, 38 minutes and 55 minutes as the average time lost, during a shift, in waiting on cars.

In connection with hard usage, there was the matter of water at the working face. Obviously, neither a mechanical loader nor a conveyor is designed to be used as a pump, yet many a face, knee-deep in water, has been "bailed out" by both types of loading equipment. Eventually, the use of a \$3,000 conveyor or a \$10,000 loading machine for work which a \$100 pump would do much more efficiently, is found to be poor economy.

Another problem that came in with the very beginning of mechanical loading was that of face preparation. Delays resulting from tight shots gave rise to multiple cutting, shearing and the invention of new ways for breaking down the coal. Dull cutting bits, in addition to increasing the amount of slack, were found to be retarding the speed of production, and as a correction, a number of bit types have been devised, ranging from factory-made multiple points to tipping with hard alloys. All these devices recognize that the essential requirement for efficient coal cutting is, obviously, to have sharp bit points, uniform in size and correctly shaped.

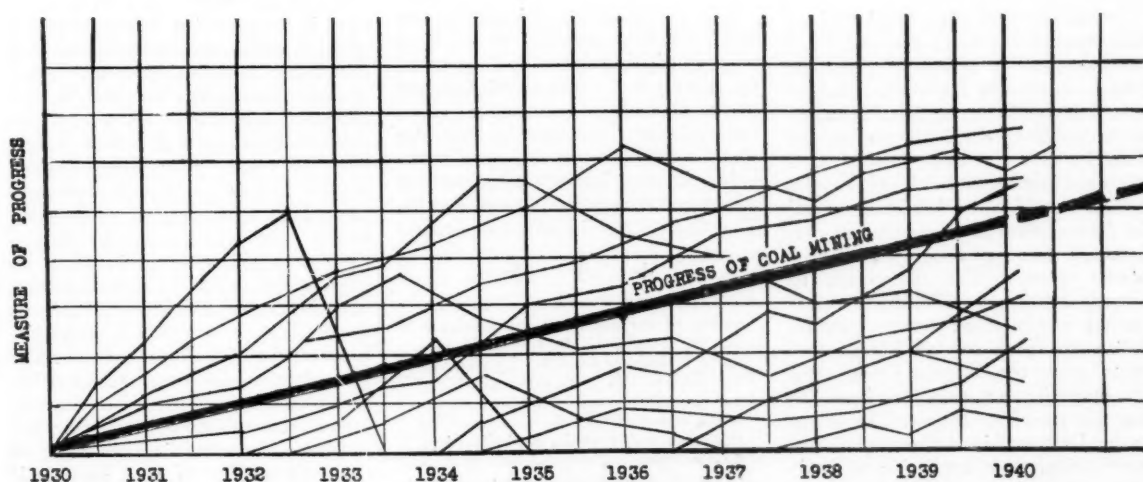


Hand picking the impurities from the seam was almost invariably attempted, and frequently is today, when machines were first installed. A few mines have clean seams, but everyone is not that fortunate, and many records show that 25 percent or more of the loading time and tonnage has been lost when hand picking underground is depended upon to clean the coal. Where such a condition exists, the answer has been either selective mining or mechanical cleaning.

### Conclusion

The ways to correct the various troubles just enumerated have been slow in developing because of the fact that the need for correction was slow in becoming apparent. To explain further; mining is a chain of operations, and it is easy to see that the increase to present day performance has come a step at a time—that is, one operation in the chain was raised up to the point where something else was thrown out of balance; then this second item had to be corrected, and so on.

The progress made has therefore been through improvements in all the phases of mining, from cutting to surface preparation, and behind the story of these improvements there lies one basic fact. The essentials for successful operation are correct engineering and efficient management.



The above chart is merely a pictorial graph to illustrate hypothetically the numerous lines of development in every phase of mining, and their varying degrees of success



# KING COAL or COURT FOOL?

By HON. ROBERT GRAY ALLEN

Member of Congress from Pennsylvania

THE present experiment in government control of the bituminous coal industry is not an isolated problem which should be considered in a restricted sense. Other great American industries are confronted with similar threats to their independence; the woes which beset them are similar to those which have troubled coal. From other angles sharp-shooting federal bureaucrats are sniping at free institutions in our commercial system. If government control of coal—which must result in eventual ownership—is to obtain, other natural resources will be similarly regimented, and the disease will eventually spread throughout all private industry. Around the hoary head of old King Coal rages the battle between free enterprise and regimentation, between industrial freedom and bureaucratic dictatorship. If coal surrenders, the path has been cleared for encroachments in other fields. In the fight now being waged against the Guffey Coal Act the time-tested American system of free business enterprise is at stake. One has only to read the speeches of Secretary of the Interior, Mr. Ickes, to verify the truth of this statement.

## Stresses Philosophy Behind Government Control

I am not a coal expert but I do know something about economics and government. It is not my purpose here to emphasize the obvious importance of coal in our national economy or to weigh in detail the merits and demerits of the Guffey Coal Act. I am more interested in the philosophy behind that Act, its implications and its future effect not only on the coal industry but upon our entire economic system. The temptation to sidestep heavy responsibilities is a congenital weakness of human nature. When the problems of self-government grow too onerous people tend to surrender personal freedom for material security. They end by losing both. Dictatorship is the result. The same principle is applicable to business and businessmen. The moment businessmen grow weary of wrestling with their own problems and rush to the government for help, they take

the first false step on a downhill road. And there may be no turning back. For every ounce of security it may give, the government will take 10 pounds of freedom in return. Students of history know this but somehow the rank and file of human beings never learn from the experiences of the past.

Nature in her immutable code gives us the choice between profiting by the experience of others and learning from our own experiences. History is replete with examples of the disastrous results of government interference with private enterprise. The path which the bituminous coal industry is following under the Guffey Act is well marked with warning signs erected by other victims who once travelled the same road. If these signs are heeded now it will be a happy day for a great industry but if they are ignored, penitent operators soon will be placing their own admonitions for innocents who may be tempted to follow. The bituminous coal industry must turn back before it is too late.

## Mild Regulation May Be Justified

I do not mean to mitigate the sore and perplexing problems which have confronted bituminous coal operators for many years. Because this industry is vested with a tremendous public responsibility there may be justification for a mild degree of federal regulation in the interest of operators, miners and the consuming public alike. The Guffey Act in effect is drastic.

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EDITOR'S NOTE—Congressman Allen, author of the accompanying article, is also author of a bill to amend the National Bituminous Coal Act by eliminating the tax and price-fixing provisions and providing greater latitude for marketing agencies. His views, as forcefully expressed in this article, are believed to be representative of those held by producers of a major part of the nation's bituminous coal. Further comments on the subject, either pro or con, are invited.

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It violates fundamental economic principles. Most unfortunate of all, however, is the fact that under the Guffey Act one abuse is bound to develop others which will be more devastating in effect. Instead of ameliorating the problems of the soft coal industry, the Guffey Act will aggravate them in geometrical progression. One look at the record clearly indicates that no one has benefited from this ill-starred legislation except the swarm of political appointees who vainly try to administer its impossible provisions. If it were sound, the Guffey Act would be producing beneficial results by now. For nearly five years two commissions and more recently the Department of the Interior have wrestled with the legislation and have failed to establish one single permanent price schedule. In fact, the only benefit resulting from countless hearings and the waste of countless dollars has been the knowledge that legislation has been enacted which cannot be properly administered and that the dangers of governmental intrusion in the field of private enterprise are too great.

Under the Guffey Act the government is charged with the responsibility of eliminating corrupt trade practices, preventing wasteful competition and virtually guaranteeing a profit to the industry itself. Government can successfully handle the first two charges but the third, price fixing, never! In the history of human experience there has never been a case where profits have been successfully assured to a privately operated industry by government edict. Those who profess faith in the price-fixing provisions of the Guffey Act arrogate to the legislation and to its administrators a degree of perfection never achieved before by man. Temporary benefits may derive from arbitrary price-fixing but as inexorable economic laws begin to react the futility of such an experiment becomes obvious. At this point two courses of action are open. The first suggests an entire change of procedure and the second, more experi-

mentation and more control. It is perfectly obvious which course Mr. Ickes' bureaucrats will follow. Having failed in their first attempts to regulate, they will establish an excuse for their derelictions. That excuse will be insufficient authority and too little control. To buttress their price-fixing powers, they will demand control of production. A drive for tonnage allocation will begin—in fact it has begun already—and in the visible future Mr. Ickes or his successor will be absolute czar of the coal industry. That is the stuff of which bureaucrats are made. Once established, their primary objective is self-perpetuation; they grasp constantly for more power. They succeed for a time or until the object of their intentions withers from overdoses of pink pills and strangles from too much red tape. The most vicious lobbying in Washington today is conducted not by business interests but by government agencies seeking to perpetuate themselves. So, having failed to regulate the bituminous coal industry these same people will essay to operate it. This vicious trend would be ludicrous were it not so tragic.

It is obvious that the government cannot regulate the bituminous coal industry without assuming full control. It cannot assume this control until it owns the mines outright. The soft coal industry is therefore faced with two alternatives: outright government ownership or the return of administrative control to private operators with the government acting as referee. If men who have spent their lives in the bituminous coal industry cannot regulate their affairs in orderly fashion, how can one expect theorists, green lawyers and economic quacks to do better? It is apparent that if local and regional problems are too burdensome for skilled operators, the accumulated problems of an entire industry automatically exceed the administrative capacity of any government agency.

#### Magnitude of Administrative Task

One has but to consider the 500,000 different prices already established in the Appalachian area alone to realize the magnitude of the administrative task entrusted to the Bituminous Coal Division, or attend for one week hearings conducted before this Division, and you will be thoughtfully impressed with the complexities of the problem. Imagine, if you will, this government bureau attempting to coordinate prices in one district with those in competing districts, and coordinating into

this scheme different freight schedules and the differences between rail coal, water-borne coal, and coal transported by motor trucks. Then on top of that, imagine the magnitude of the task of coordinating coal prices with prices of competing fuels, realizing at once that competing fuels themselves are not regulated. Once this apparently endless task has been completed, does anyone believe that the price schedule of today will be applicable tomorrow? This is obviously impossible when we consider the dynamic condition of the factors which enter into the establishment of price schedules. Wage scales, for example, may be in a state of flux. Insurance rates and taxes may change at a moment's notice. Transportation costs will vary because the Interstate Commerce Commission will not bow to the sacrosanct edicts of Honest Harold Ickes.

#### Further Inroads by Competitive Fuels

The troubled circumstances surrounding soft coal have opened the door for competing fuels to step in. Unquestionably producers of fuel oil and gas have profited by coal's distress. In many instances large consumers have refused to be annoyed by the 30-day restrictive contract clause in the Guffey Coal Act. They have accepted the greater stability offered by competitive fuels. Soft coal has suffered vast tonnage losses from this factor alone, not to mention concomitant losses from dislocated production schedules. Consumers of coal who depend on uninterrupted stability in their own production will be forced to contract for other fuels as coal continues to be disjointed by constantly changing administrative osteopathy. It is perfectly apparent to students of this problem that gas and fuel oil must eventually be subjected to the same degree of government control as coal if this experiment is to continue, and justly so! Why should coal be fettered when its competitors go scot free? If gas and oil producers are wise, they will assist in repealing or amending the Guffey Act because if Mr. Ickes has his way, he will soon be squatting like a mother hen on the entire fuel industry.

#### Need Clarification of Anti-Trust Laws

The government has criticized the bituminous coal industry for disunity and lack of cooperation among its members. The government itself is more responsible for this condition than any one else. If the government will clarify the anti-trust laws now

on the statute books, the coal industry can be brought into harmony by the operators themselves. We all agree that industrial combinations in restraint of trade should be curbed. We will not agree, however, that combinations to increase consumption, lower costs, maintain fair wages, and earn a fair profit should be punished. Indeed they are economically sound and should be fostered. In such cases the government should act as a referee to insure against abuses. This is far more compatible with democratic processes than the role of policeman which Uncle Sam is now playing in the bituminous coal industry. If our government wishes to aid the coal operators in a substantial way, it must first yield back the arbitrary control which it now wields, and it must permit reasonable cooperation within the industry itself. I am convinced that if anyone can stabilize the bituminous industry, it is the operators. They must be permitted to proceed without fear of persecution.

Coal operators will do well to heed the following words of Justice Brandeis:

"Experience should teach us to be more on our guard to protect our liberties when the government's purposes are beneficent. The greatest dangers to liberty lurk in insidious encroachments by men of zeal, well-meaning but without understanding."

The Guffey Act must be amended or the bituminous coal industry as a free institution will disappear. In recent years we in America have fed too much private enterprise into the maw of bureaucracy. Government functionaries have tasted blood and like it. They are already roaring for more. The deadline has been reached and we cannot yield another inch with impunity. King Coal has wandered into the wilderness a little farther than his royal confreres. If he vigorously turns back, he can regain his throne but if he continues his peregrinations, it is safe to predict that he will soon be reduced to Court Jester at the throne of Mr. Ickes.

#### Dates for West Virginia Coal Conference

The 1940 renewal of the annual West Virginia Coal Conference has been set for October 18 and 19, according to a recent announcement by W. E. E. Koepler, of Bluefield, secretary of the Pocahontas Operators Association and chairman of the conference program committee. This will be the fourth annual conference, and, as has been the case since the inaugural gathering in 1937, West Virginia University will again be the host.

With the

# COAL DIVISION

of the AMERICAN MINING CONGRESS

THE production of a mobile mechanical loader depends upon a number of operations outside of the performance of the machine itself, and among these subsidiary operations, service haulage is of high importance. Rapid movement of cars and short haulage distances are essential, and the function of the service haulage is to keep the machine in production with the shortest possible delay to the unit. The capacity of the mine car is a factor, but taking precedence over car capacity is the matter of track and switching arrangements; a number of different plans and systems are used, and the Committee on Haulage Roads is preparing a series of reports on these various methods.

## Basic Principles to be Covered

In preparing this study, the committee recognizes that many variables enter into this question through the different seam and physical conditions encountered in mining, as well as different mining systems, and it is not their thought that any one method of track layout can be recommended for all mines. However, an examination of a number of successful methods now in use will serve to show certain fundamental principles that have to be observed, and it is planned to submit a fairly comprehensive report that will explain in some detail how successful service haulages are installed and operated.

It is the opinion of the committee that service haulage, instead of being a complicated operation, is really very simple, and the greater the simplicity in the arrangement, the more efficient will be the resulting operation. Good track is of course the first essential, and this requires the use of first-class material and proper construction methods. The design of the track layout must of course be based on sound engineering and good operating practice, but unless the track is properly constructed and maintained, the engineering will be largely wasted. Specifications for proper material and methods must be rigidly enforced.

The accompanying two plans, which are submitted as a part of the committee's preliminary study, illustrate the two major essentials for a success-

## SERVICE HAULAGE TRACKS

● A Report by the Committee on Haulage Roads

ful service haulage system—design of the layout and construction methods. Figure 1 shows the track arrangement for a complete panel, and figure 2 shows details for rapid installation and recovery of track material.

### Room and Pillar Panel

Figure 1 covers a plan that has been evolved after a number of years of operating experience. This is a room and pillar system with track and switch facilities for using two gathering locomotives to serve one mechanical loader. These locomotives handle the cars between the machine and the

storage points near the live workings, as shown on the sketch. A relay locomotive hauls from the parting on the main line to these storage points; one relay serving two loading units in adjacent panels.

The car movement is very simple. The gathering locomotive places a car at the machine and after loading, hauls it to the load storage on the entry. As soon as it leaves the machine, the second locomotive, which is waiting in the adjoining room cross cut, places an empty, and while it is being loaded, the first locomotive is picking up another car from the empty storage, and coming to the cross cut in readiness

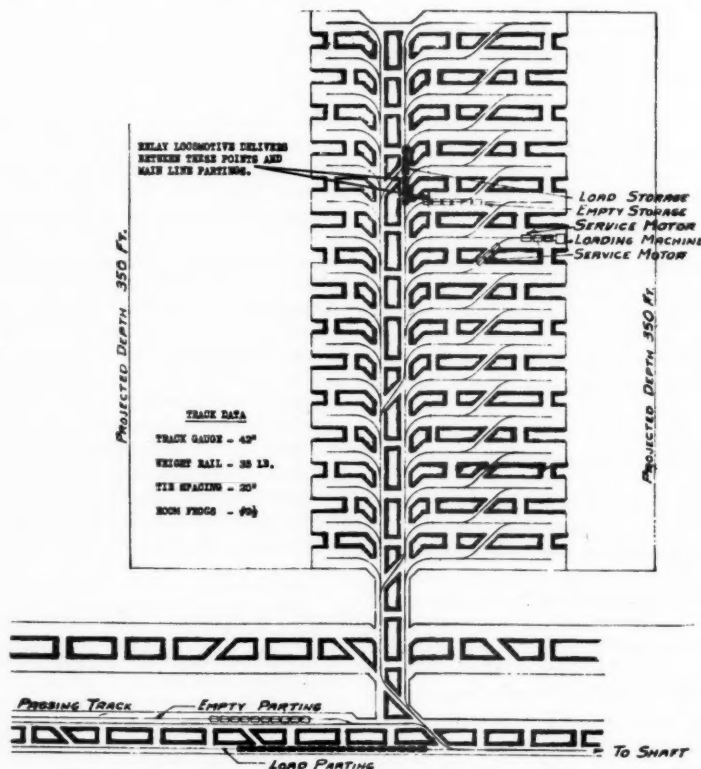


Fig. 1. Service haulage plan for entire room panel



for its turn. The effectiveness of the operation is indicated by an average time for changing cars at the loading machine of from 40 to 45 seconds.

The mine cars are of 4-ton capacity. The track is well constructed throughout the panel, with 35 lb. rail in the entry, and in the rooms as far as the cross cut switch. Beyond this point to the face of the room, the track is 25-lb. rail. Ties are placed on 20-in. centers under the 35-lb. rail, and on 36-in. under the 25-lb. rail.

### Open-End Pillar Drawing

Figure 2 shows the details of the track construction where mechanical loaders are used in open end pillar recovery. At this mine, narrow rooms are driven on 75-ft. centers, and the wide pillar between the rooms is mined by driving a series of 20-ft. cuts across the end. After the cuts are completed across the pillar, the next 20-ft. lift is driven along the edge of the gob, and so on until each pillar is mined out down to the entry.

Under this method it is necessary to shorten the room track at frequent intervals and, as shown on the sketch, the track for the room advancement is designed for this quick and convenient removal. The rail is laid in 20-ft. lengths, which eliminates any necessity for rail cutting to make the turns at the proper place for each succeeding open end cut.

A special feature at this operation is the reduction of track work underground. In addition to the 20-ft. rails, all curves are pre-bent at the surface shop; this applies both to the turns and to the switches. Besides reducing the time of the track crews, the pre-bending gives a further advantage of a well constructed road that permits rapid movement of cars and other track mounted equipment. The photograph in Figure 3 shows the excellent alignment that is had around a reverse curve.

The one thing which makes this system possible and gives a high degree of operating economy is the rigid adherence to plans and specifications. The end cuts are made on 20-ft. centers, which in this mine means 20-ft. centers. Obviously, any deviation from this measurement would throw the whole scheme out of adjustment, and the management sees that such things do not take place.

As stated above, the two plans submitted here are the first of a series which will be presented in subsequent reports by the committee, showing a number of successful service haulage systems in operation.

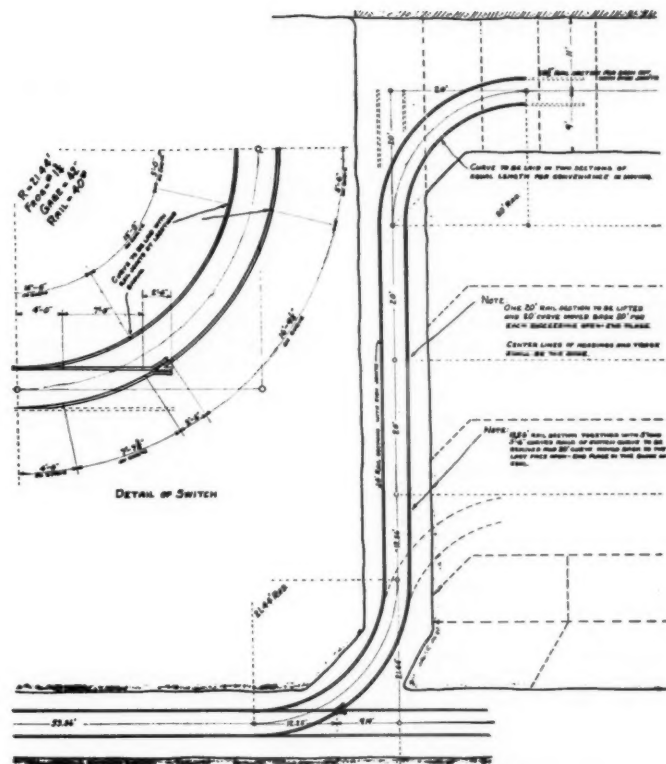


Fig. 2. Track details for open-end pillar recovery



Fig. 3. Excellent alignment on curve through use of pre-bent rails

## HOW WET IS WET COAL?

### Discussion and Tentative Scheme for some Tests

By T. W. GUY

THE need for some definite method of classifying coal as wet or dry in relation to screening has always been one of the chief obstacles to intelligent solution of screening problems.

Without such a classification it is almost impossible to make even an approximate estimate of the average percentage of a given feed which is too wet for thorough screening. As a consequence, the selection of screening equipment, its arrangement and adjustments for the job to be done are frequently so poor as to result in unnecessarily high percentages of over and undersize, more impurities and moisture in washed coal, high sludge losses, more complaints from customers, and frequently seriously reduced sales realization.

In a limited study of the effect of moisture on the screening of five or six different coals at openings of various sizes and shapes from  $\frac{1}{8}$  in. to  $\frac{3}{8}$  in., and on several types of screens, it was observed that no appreciable blinding of the screen due to buildup of fine particles occurred until the moisture in the coal was sufficient to wet the wires or plates of the screen. If this proves to be generally true, we may be able to say that for screening purposes the dividing line between dry and wet coal in a given feed comes when its moisture is just sufficient to wet the screen surface. Obviously such a definite classification would be very helpful in our study of the effect of moisture on screening.

This wet and dry classification may be made very simply and as often as may be necessary by using a piece of 14-gauge smooth galvanized steel plate  $2\frac{1}{2} \times 4\frac{1}{2}$  in. attached to a suitable handle by which it may be placed and held flat on the screen surface, allowing the coal to flow over it for a period of say 20 seconds, after which it is raised and examined. The coal is then classified as wet or dry, according to whether the plate is wet or dry.

Note: This report is a preliminary study submitted to the Coal Division Committee on Surface Preparation by T. W. Guy, consulting engineer, Charleston, W. Va., who is chairman of the committee.

Hereafter in this discussion the plate suggested above for determining whether the coal at a given time is wet or dry will be referred to as the *test plate*. The *total moisture*, found in samples of the *through product* of the screen when the moisture is just sufficient to wet the test plate, will be referred to as *moisture S*.

The following tests are outlined in the hope that some or all of them may prove useful to those who want to improve their results in screening wet coal; also, that they will report the results of such tests with their suggestions to our committee, with the understanding that the source of such data will not be disclosed without permission.

#### 1. Percentages Dry or Wet

For data to determine the percentages of dry and wet coal by the use of the test plate it will only be necessary to determine and record the time of each change from wet to dry feed and vice versa, also to record and deduct the time of any shutdowns or periods when the screen is operating without normal feed.

After a little practice the observer will be able to tell from the appearance of the coal when the moisture approaches the S point, and he will then begin to test to determine the exact time of change. Between such times only attentive observation will be necessary.

#### 2. Blinding

(a) The observer should note and record the extent of blinding, if any, which occurs during each dry period, estimating in each case the percentage of open area closed; for example, "blinding 10 percent" would indicate an estimated 10 percent reduction of open area in the screen. In this case blinding should refer to build-up of fine material, and NOT to large pieces jammed in the openings, although the reduction of area due to large pieces increases with the blinding or build-up of fine material. The reduction of area due to large pieces should be estimated and recorded separately.

(b) The extent of blinding and blocking by large pieces during each WET period should be estimated and recorded separately as above; also record any brushing or cleaning of the screen cloth and whether the screen was in operation or shut down during such time.

(c) Records should also be made of the time required after the coal comes dry to clear up partial blinding.

#### 3. Sampling for Moistures

(a) In every case where there is trouble with moisture it will be useful to know the *total moisture* in the *through product* which corresponds to the S moisture observed on the test plate. For this determination increments should be taken from the *through product* of the screen at the instant the test plate indicates the moisture just sufficient (see 3 c) to wet the plate. In most cases it will be necessary to take the increments at a point more or less distant from the point where the test plate is used. Therefore, the necessary time interval should be allowed for the coal tested by the plate to reach the sampling point. The increments for moisture S should only be taken when the screen is free, or practically free, of blinding; otherwise, the increments will not have the proper size consist or moisture.

(b) Increments for moisture samples should cut the entire stream without overflowing the receptacle, should be placed immediately in moisture-proof containers with tight-fitting covers, and every necessary precaution should be taken to avoid unmeasured change of moisture during or after taking the samples.

(c) In this test judgment must be used by the observer in determining as nearly as is practicable when the coal has neither more nor less than the S moisture. If in doubt, the test plate should be wiped dry and the test repeated until the right condition is found for taking each increment.

(d) Tests available on a few coals show moisture S ranging from 6.0 percent to 7.5 percent, and deducting approximate bed moisture indicates surface moistures ranging from 3.5 percent to 5.0 percent, in through products of screens ranging from  $\frac{3}{16}$  inch to  $\frac{3}{8}$  inch. In a given coal the S moisture will increase as the size of screen decreases. It is believed, however, that the test plate classification as to dry or wet coal should remain unchanged regardless of whether the

size of screen openings be increased or decreased, at least within reasonable limits.

#### 4. Sampling for Screen Tests on Over and Through Products Under Dry and Wet Conditions of Feed

Suitable containers should be provided and marked "Dry OP" for the dry over-product, and "Wet OP" for the wet over-product. Similar provision should be made for the dry and wet TP or through product. If necessary, two samplers should be used and stationed where each increment can cut the full stream without overflowing the receptacle. The observer will call the time for each increment to each sampler, and indicate whether it is to be placed in the dry or wet sample.

#### 5. Moisture in Dry and Wet Samples of Through Product

(a) When moisture is required in the dry or wet sample, or both, special moisture samples should be taken by cutting the stream with a sample scoop as each increment of the sample of TP for screen test is poured into its container. These special moisture samples should be handled with the same precautions as specified for S samples.

(b) The sample of dry coal will consist of increments ranging from the driest coal, which might be materially less than bed moisture in extreme cases, to a maximum equal to the S moisture. The increments of the wet coal will range from the S moisture as minimum to a maximum which might reach saturation or even more.

In some cases it may be desirable to attempt a further moisture classi-

fication of either the dry or wet product. If so, a study of all the existing conditions would be necessary in order to determine how it could be done to best advantage.

\* \* \* \* \*

It is to be expected that some coals will show some blinding at less than the S moisture, and that in these or some other cases the screening efficiency may be reduced more or less by moisture before it reaches the S point, but observations so far indicate that at a reasonable rate of feed good screening is practicable without any special effort or precautions up to approximately the S moisture. Beyond this it is believed that with more definite data as to how much, when and how the wet coal comes, the problem of how to handle and screen it satisfactorily will be simplified.

## Toward A Banner COAL SHOW

A COAL SHOW cram full of beneficial ideas, action and fun—that's what coal men are predicting for the 17th Annual Coal Convention and Exposition of the American Mining Congress to convene in Cincinnati, April 29-May 3.

Everything points to a banner year. Committeemen have already lined up a program, under the guidance of Harry M. Moses, president, H. C. Frick Coke Company, as national chairman, that will run the gamut of MUST subjects for progressive mining men; new plans to insure smooth functioning of all convention activities during the week are now being formulated by the committees on arrangements, headed by E. M. Douthat, vice president of Sinclair Coal Company as general chairman; and the manufacturers have already contracted for over 80 percent of exhibit space in Music Hall, indicating an early sell-out and an exposition of mining equipment and supplies that will be chock full of valuable operating hints.

#### Program Completed

The head start made this year in drafting the program has permitted its virtual completion at this early date; authors have been busy for over a month gathering data to incorporate in their valued contributions. In line

with the committee's suggestions, special appeals have been made this year to authors to stress broad applications so far as possible—drawing from experiences with several properties, rather than detailing some particular phase of their own operation. Mine modernization will, of course, be the theme.

The Monday morning session will stress modernized practices in face preparation, with a paper on "Coordination of Face Preparation with Mechanical Loading" and one summarizing modern face preparatory methods.

Vocational training, power and roof support—a variety of key subjects—will feature the Monday afternoon session, with papers on "Vocational Training and Technical Education," "Rectifiers and Other Conversion Equipment," and "Roof Support in Coal Mining."

A comprehensive account of present developments of coal cleaning, dealing as far as practicable with fundamentals rather than detailed descriptions of individual plants, will be covered on Tuesday morning. Specific subjects include: "Economic Possibilities of Small-Cleaning Units," "Recovery and Utilization of Refuse from Cleaning Plants," and "Modern Coal Cleaning Practice," the latter includ-



E. M. DOUTHAT  
General Chairman of the Arrangements  
Committee

ing papers on the Appalachian field and the Rocky Mountain field.

A comprehensive review of mechanical loading and conveying will feature the Tuesday afternoon session, with special emphasis on important developments in applying mechanical loading to conveyors. Starting with the duckbill, primarily a stationary mechanical loader, the session will include the combination of mechanical machines with conveyors, and go on to present the recent advance of mul-



tiple conveyor systems with hand loading.

No subject has received more consideration in operating a coal mine than proper maintenance of equipment—to be thoroughly reviewed at the Wednesday morning session. Break-downs during the shift are recognized as a direct reflection on management, and the papers at this session will show methods that have been found successful in keeping the equipment in good operating condition. Practices covering all types of mining from mechanical loading to coal stripping will be described.

Papers presented at the Wednesday afternoon session have been selected to show the most modern practices in the application of mobile mechanical loaders. Included in the discussion will be track and tractor-mounted machines and types of service haulage using mine cars and rubber-tired shuttle cars—with considerations covering all phases of mining from entry driving to pillar recovery.

Subjects of national interest, aside from strictly operating questions, which directly affect the welfare of the coal industry and have considerable bearing on mine operation will be discussed at the Thursday morning session.

The closing session on Thursday afternoon will be turned over to a comprehensive discussion on the cardinal problem of safety in mining. Included will be papers on "Safety Records with Mechanical Mining vs. Hand Mining," "Accident Sources and Overcoming New Hazards," and "Fixing Responsibility for Mine Accidents."

## General Arrangements Progressing

Following the acceptance of E. M. Douthat as general chairman of the Arrangements Committee, organization of the various committees to work under his direction are now virtually completed. Heading these groups are the following men, with succinct reviews of committee duties.

**Attendance**—T. J. Thomas, president, Valier Coal Company, chairman. Enlist support of coal mining men throughout the country in bringing out a record-breaking attendance.

**Entertainment**—J. W. Haddock, vice president, Sullivan Machinery Company. Develop a program of entertainment during the four evenings of the convention with plenty of "oomph."

**Floor**—Wesley S. Harris, president, Bicknell Coal Company. Assist session chairmen in carrying out program according to official schedule, and help develop informal discussion of the papers.

**Miner's Exhibit**—A. W. Hesse, chief engineer, Buckeye Coal Co. Organizing an exhibit at Music Hall of original "operating gadgets" designed by employees of coal companies to meet some specific operating problem.

**Publicity**—Louis J. Ott, advertising manager, Ohio Brass Company. Campaign vigorously to arouse the widest possible interest in the Cincinnati meeting through publicity in all suitable channels.

**Welcoming**—R. H. Morris, general manager, The Gauley Mountain Coal Company. Extend a glad hand to visitors at Music Hall and make them feel thoroughly at home.

A meeting of the Publicity Committee was held in Pittsburgh, Feb-

ruary 7, and the Entertainment Committee gathered in Cincinnati on February 8, at which plans were thoroughly discussed and methods detailed for aggressive future action by both groups.

## The Exposition

Manufacturers are preparing to extend themselves to the limit in giving the Coal Show visitors a complete picture of the part they play in producing the nation's coal safely and efficiently. With Music Hall crammed from stem to stern by exhibits of everything required in coal production, mining men will be able to see and hear how up-to-date equipment and supplies can meet their every problem. The exposition floor will have an assortment of brand new equipment that is worth anyone's attention. Changes in mining are being made fast and the exhibits will be a real review of the "status quo" of getting out coal today. In addition to the spanking new features, many old standbys that have undergone a "face-changing" will be a real surprise.

All in all, no progressive coal mining man can afford to miss this annual review of the manufacturers. Although the various machines and pieces of equipment can't talk, the trained representatives and engineering personnel of the exhibitors will be on hand in full force to lend any help they can in explaining the "how" and "why" of their products. The Coal Show will be open from 9 a. m., Monday, April 29, until 1 p. m., Friday, May 3, closing at 6 p. m. daily—40 "golden" hours for you—if you are present.

## Prospectors Association Program

Summing up the 1939 activities of the Great American Prospectors Association, George H. Watson, scribe of the association, with headquarters at Salt Lake City, recently outlined resolutions passed and widely distributed by the association, which urged: (1) enlargement of the Utah Prospectors School; (2) continuance of excise tax on foreign copper coming into the United States; (3) passage of resolution by Utah state legislature inviting capital and labor to Utah; (4) opposition of Federal leasing of lode mining claims and favoring continuance of present law; and (5) opposition to extending the moratorium on annual labor done on unpatented mining claims.

Principal activity for the present year was stated to be work toward the establishment of a retirement

home for indigent, crippled and aged prospectors, to be located in the heart of some mining section which will remain active for years to come, so that prospectors would be in their native environment.

## American Zinc Leases Texas Smelter

Howard I. Young, president of the American Zinc, Lead & Smelting Co., early in January, announced that the Dumas, Tex., zinc smelter of Peru Mining Company, a subsidiary of the Illinois Zinc Company, has been leased by the American Zinc Company of Illinois. It was anticipated that the plant would be in production late in January or early in February.

The plant will treat the zinc concentrate production of the Deming

mill and other concentrates that originate in the southwest. It will be operated at a capacity of approximately 1,000 tons of metal per month, and will give employment to 130 to 150 men. The American Zinc Company of Illinois is a wholly owned subsidiary of the American Zinc, Lead & Smelting Company.

There was accidentally found in California recently a piece of scrap brass that turned out to be Drake's long-lost brass plate. According to Sir Francis Drake's own narratives of his famous voyage around the world in the *Golden Hind* in 1579, he visited California and nailed a "plate of brasse" to a post, naming this land New Albion and claiming it for Queen Elizabeth of England and her successors. After 350 years the plate was finally found.



## ANACONDA 997

### Low Fuming Welding Rods

**A**NACONDA 997 (Low Fuming) Welding Rod — high strength, tough weld metal with low fuming characteristics—has been added to the extensive line of Anaconda copper alloy welding rods. It is widely used for the general oxy-acetylene repair-welding of cast and malleable iron, steel and copper . . . It is particularly

valuable where repairs must be made quickly and easily on machinery parts, automobile engine blocks and similar equipment. Anaconda 997 Welding Rod is manufactured under United States Patents Re 17,631 and 1,525,058. Available from supply houses handling Tobin Bronze and other Anaconda Welding Rods.

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# Anaconda Welding Rods

# 42nd Annual Meeting of the American Mining Congress

ON JANUARY 18 members, officers and directors of the American Mining Congress gathered in New York for the Annual Meeting. Representatives of the industry were present from Alaska, the Pacific Coast and Mountain States on to the coal and iron mines of the Middle West and South-east.

A large Resolutions Committee, under the chairmanship of Mr. Cleveland E. Dodge, vice president, Phelps Dodge Corporation, met early in the morning, and, after two hours of discussion of national issues and their effect upon the mining industry, proceeded to the consideration of resolutions by sub-committees appointed for their intimate knowledge of the problems involved. The final report of the full Resolutions Committee was completed at 6.30 p. m. in form to be presented to the members at the dinner meeting as a compact "Declaration of Policy."

At the annual business meeting which followed the dinner, President Howard I. Young, of the American Mining Congress, who has devoted so much of his time and energy in behalf of the industry, earnestly requested the members to present to the officers and the Board of Directors their suggestions for improvement in the service which the organization is rendering and for guidance in the policies which govern the position taken by the Mining Congress in national affairs. Nominating Committee Chairman Andrew Fletcher, vice president, St. Joseph Lead Company, presented the report on nominations for Directors to serve for a three-year term as follows:

A. E. Bendelari, Eagle-Picher Lead Co., Cincinnati, Ohio.

J. B. Warriner, president, Lehigh Navigation Coal Co., Philadelphia.

David D. Moffat, vice president, Utah Copper Co., Salt Lake City, Utah.

H. L. Pierce, the M. A. Hanna Co., Cleveland, Ohio.

Charles H. Segerstrom, president, Nevada-Massachusetts Co., Sonora, Calif.

Following the election of Directors, Secretary Julian D. Conover presented

HOWARD I. YOUNG  
President, American  
Zinc, Lead & Smelting  
Co., was reelected  
President of the  
American Mining  
Congress



a summary of the activities of the organization during 1939 (see pages 62 to 64), in which he included a resume of the work of the Executive Tax Committee because of the enforced absence on account of illness of Tax Committee Chairman Henry B. Fernald. The meeting received the reports of Chairmen Erle V. Daveler, Finance Committee; Samuel H. Dolbear, Committee for Cooperation with the SEC, and Herbert Wilson Smith, Committee on Social Security.

Chairman R. L. Ireland, of the Coal Division, after a discussion of current legislative matters, told the meeting that more has been done to develop mechanization and the art of coal mining through the work of operators and machinery manufacturers under the sponsorship of the Mining Congress than has been forthcoming from any other source. Mr. C. C. Dickinson, president of the National Coal Association, brought greetings from his membership to the Annual Meeting, and expressed the desire to cooperate to the fullest extent with the Mining Congress.

General discussion ensued, in which members from all parts of the country

commented on the work of the organization and its value to the mining industry, and talked over problems facing the industry in the coming year. Among those who spoke were W. S. Boyd, of San Francisco, vice president, Nevada Consolidated Copper Corporation; Donald A. Callahan, of Wallace, Idaho; Merrill E. Shoup, of Colorado Springs, Colo., president, Golden Cycle Corporation; Charles E. Dunlap, president, the Berwind-White Coal Mining Company; James R. Hobbins, executive vice president, Anaconda Copper Mining Company; Carl E. Zapffe, of Brainerd, Minn., manager, Northern Pacific Iron Ore Properties, and R. Dawson Hall, associate editor of *Coal Age*.

In recognition of the outstanding service rendered the mineral industry by the retiring Director of the United States Bureau of Mines, Dr. John Wellington Finch, the following resolution was adopted:

We, the members, officers and directors of the American Mining Congress, representing all branches of the mining industry, assembled in our 42nd Annual Meeting, desire to express to Dr. John Wellington Finch our high admiration for his able conduct of the valuable scientific, technical, economic and safety-work of the United States Bureau of



# BOARD OF DIRECTORS



J. B. WARRINER



D. D. MOFFAT



E. B. GREENE



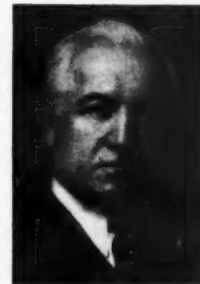
L. S. CATES



J. D. FRANCIS



A. E. BENDELARI



DONALD A. CALLAHAN



MERRILL E. SHOUP



W. J. JENKINS



CHAS. H. SEGERSTROM



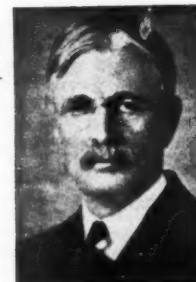
JAS. R. HOBBS



H. L. PIERCE



FRANK E. MUELLER



CLINTON H. CRANE

Not shown—

N. W. RICE

Mines over the past six years. Under his direction the Bureau has been developed to a high state of efficiency and has been administered with unquestioned integrity and a sympathetic understanding of the needs of the mining industry and of the men employed therein.

We wish to convey to him the gratitude of mining men throughout the country for his tireless and unselfish performance in their behalf while serving as Director of this important agency of our Federal Government.

A meeting of the Board of Directors followed the business session and re-elected officers as follows:

Howard I. Young, president.

D. D. Moffat, first vice president.

E. B. Greene, second vice president.

D. A. Callahan, third vice president.

J. F. Callbreath, secretary emeritus.

Julian D. Conover, secretary.

The Executive Committee, consist-

ing of Messrs. Howard I. Young, D. D. Moffat and W. J. Jenkins, was also reappointed for the coming year.

The Declaration of Policy approved by the meeting, to be found on succeeding pages, constitutes the consid-

ered thought of the mining industry on national affairs and has been given wide distribution, including the placement of copies in the hands of each member of the Senate and the House of Representatives of the United States.

# A DECLARATION OF POLICY—

THE AMERICAN MINING CONGRESS, assembled in its 42nd Annual Meeting, January 18, 1940, herewith declares its views upon the following subjects of public policy:

## *Constitutional Government*

Common honesty, social justice, free consent of the governed, freedom of religion, speech and education, a free press and the free right of assembly and petition are some of the foundations on which our constitutional government is founded. In a world torn by war and dictatorships it is well to recall our inalienable rights and to reaffirm our belief that the state should exist for the citizen and not the citizen for the state. Civilization and prosperity flourish increasingly as governmental authority is restrained. Human liberties flourish as the activities of government are curtailed. Constitutional democracy dies in every nation where government usurps the planning under which citizens must conduct their business. The American system of free enterprise and equal opportunity for all must be preserved. We pledge ourselves to that ideal.

## *War and Peace*

War inevitably leads to the destruction of lives, homes and happiness. It brings in its train economic chaos, financial instability and depression. Nobody gains anything either in spiritual or material welfare from war. We do not believe that the profits of war are, in the final analysis, of benefit to anyone. Our country lives today in peace and freedom. The American Mining Congress pledges itself to support all sound measures designed to protect us from involvement in war.

## *Relation of Government and Business*

Confidence is the foundation of economic recovery and stability. Essential to confidence are balanced budgets; stable money; thoughtful, well-considered legislation confined to sound, general principles; impartial administration of the law; and encouragement of private enterprise and initiative.

The delegation of legislative powers to boards and commissions violates the principle of representative government.

Government should not engage in competition with private industry.

## *Labor Relations*

We believe in collective bargaining between employers and employees, but we do not believe in the promotion of national and international labor unionism by law.

We believe that the National Labor Relations Act is wrong in principle. It is founded upon the premise that labor and employer are necessarily in conflict and that the government should take sides. We object to such a division of our people into classes, and we hold that the government should act only as a conciliator of industrial disputes.

We endorse amendments to the law which will bring about the adjudication of labor disputes according to established rules of procedure and will remove the practice of the National Labor Relations Board acting as accuser, prosecutor and judge. Fair treatment of both labor and employer on an equal basis will promote industrial peace and discourage interruption of the business of the nation through strikes and lockouts.

We urge that the congressional investigation of the National Labor Relations Board be continued, supported by ample appropriations.

The Fair Labor Standards Act, in its application to mining, is impractical, especially because of the inflexible restrictions of the maximum hours provisions. It is destructive to the mining industry of many districts. We favor its repeal.

We believe that better employer-employee relations would result from a change in national policy based upon recognition of the fact that our country is too large, its industries too varied, conditions in the different states, sections and localities too diverse, to permit of successful administration of any law placing control of such relations in Federal agencies.

## *Subversive Activities*

Subversive and un-American activities are a constant threat to a stable government and peace. We approve the aims and objectives of the Dies Committee, and urge Congress to renew the appropriation necessary for its continuance.

## *Tariff*

We do not favor the extension of the Reciprocal Trade Agreements Act unless it is amended to eliminate certain defects which experience has developed:

The policy of gratuitous extension of concessions to nearly all countries does not result in benefits to the United States equivalent to its sacrifices and should be abandoned.

The Trade Agreements Committee has not given each commodity the careful, complete and expert consideration it deserves, and has inflicted unduly severe burdens on established domestic industries.

Administrators of the Act have not applied the treaty provisions permitting modification where exchange rates are seriously altered. They have not utilized clauses in the treaties providing for withdrawal of specific commodities when countries outside a given pact reap the principal benefits at the expense of our domestic industries.

The practical application of the Act has not demonstrated a feasible method to provide tariff increases when necessitated by changed domestic conditions.

Reciprocal trade agreements are in fact treaties and should be ratified by the Senate.

## *Taxation*

We commend the action of the Congress in repealing the undistributed profits tax and imposing a flat-rate tax on corporate incomes; recognizing the necessity of carrying forward business losses as deductions from income of future years; imposing lower rates of tax upon capital gains; allowing without limitation the deduction of long-term capital losses from corporate incomes; preserving the principle of reasonable depletion allowances; permitting the use, under specified conditions, of the so-called "last-in first-out" method of determining the cost of goods sold; authorizing the revision upward of the declaration of value for capital stock purposes; and remedying retroactively as well as prospectively judicial interpretations contrary to its policy and intent. The Congress and the Treasury have recognized the dangers of an excessive and ever-increasing tax burden for the future and have afforded a basis for hope that the Federal revenue system will be restored to a sound basis.

We advocate the enactment of a reasonably permanent revenue system based upon the policy that private employment provides the only permanent solution of unemployment; that private enterprise and initiative must be protected and encouraged; that increased industrial activity requires expansion and new enterprise; that the net return from new and venturesome enterprises must be adequate to attract private capital; that private investment must replace Government spending. Only under such policies can our revenue system produce maximum yields over a period of years; can the national income be sufficiently increased to provide adequate Government revenues; can the Federal Budget be relieved of heavy demands for unemployment relief and for extraordinary Government spending.

Consistent with the above policies, we urge that the existing high rates of tax imposed upon corporate and individual incomes, upon capital gains and upon estates be reduced substantially; the earned income of individuals be taxed at substantially lower rates than other forms of income; taxable income be computed on the basis of consolidated returns compulsory for affiliated corporations; the multiple taxation of business income from corporate enterprise be eliminated and the tax on dividends received by corporations

and the normal tax on dividends received by individuals be removed; business losses be carried forward as allowable deductions for at least five years; the prior law with respect to employee pension trusts be restored; reasonable provision for the liquidation of personal holding companies be enacted and more reasonable methods for the taxation of these companies which cannot be liquidated be prescribed; the capital stock tax be repealed at the earliest possible date, and until repealed an annual declaration of value granted; and numerous complications of the existing law be eliminated and every effort be made for substantial simplification of the law and its administration.

We believe that income from future issues of Federal, state and municipal securities should not be exempt from taxation, but we do not believe that the reduction of individual surtax rates should be dependent upon the adoption of this principle. We endorse the recommendation of the Secretary of the Treasury with respect to coordination of Federal, state and local tax systems and the removal of existing duplications.

Although we note a trend toward better administration of our tax laws by the Treasury, litigation and controversy will be lessened, delay in final determinations will be decreased, and the attempts to impose and the actual exaction of excessive and erroneous tax liabilities will be less frequent, if greater care is exercised in the preparation and promulgation of rules and regulations so that they will conform to the statute and the intent of the Congress.

### *Congressional Control of Expenditures*

A sound fiscal system requires adequate control over expenditures, which must be kept within the revenue yields of a sound and reasonably permanent system of taxation. Congressional responsibility for expenditures should be united with congressional responsibility for revenues. We urge that each House of Congress create a Committee on the Budget, the membership of which will include members responsible for appropriations and members responsible for taxation. The annual executive budget, containing estimated revenue yields and the proposed expenditures for the year, should be referred to this committee. After appropriate committee consideration and full debate, each House of Congress should then determine and fix the maximum amount of expenditures for the year, and require that the separate appropriation bills, as well as legislation authorizing appropriations, conform to this determination, and the aggregate be kept within this maximum amount. With a ceiling thus placed upon expenditures, an effective control by Congress over both taxation and appropriations can be restored and maintained.

We urge that the members of the mining industry, individually and by groups, give their full cooperation to the Congress and the administration to eliminate all unnecessary and avoidable appropriations and to bring about needed reduction in Government expenditures.

### *Monetary Policy*

We favor control of our monetary system by the Congress. We favor a currency with a metallic base as opposed to a so-called managed currency. We favor the use of both metals—gold and silver—in such monetary system, and we favor the coinage of newly mined domestic gold and silver as a means of maintaining a metallic base for our currency.

We commend the action of Congress in providing by statute for the coinage of domestic silver and its recognition as a part of the monetary base.

We urge repeal of the law prohibiting ownership of gold coin or bars by our citizens, thus re-establishing the right of such ownership. We also urge that further gold purchases be paid for with gold coin or gold certificates redeemable in such coin.

### *Strategic Minerals*

We commend the passage by Congress of the Strategic Materials Act, authorizing appropriations for the accumulation of stockpiles upon recommendation of the Army and Navy Munitions Board, and for the investigation of ore deposits by the Bureau of Mines and the Geological Survey. We pledge our cooperation in the administration of this Act.

We urge a policy of permanent stockpiles to be kept intact and used solely in the event of national emergency. We recommend in so far as possible the purchase of domestic materials, and that purchases be made at times when such action will not conflict with industrial requirements.

### *Federal Inspection of Mines*

We are opposed to the bill now before Congress, which provides a new Federal agency for the inspection of coal mines. By duplicating and conflicting with existing state mine inspection and safety agencies and by diverting the U. S. Bureau of Mines from its proper functions such agency would hinder rather than promote mine safety.

We view this proposal as detrimental to the safety progress now being made by the several states in cooperation with the mining industry and the U. S. Bureau of Mines. It is contrary to sound public policy in extending Federal jurisdiction over matters properly within the jurisdiction of the states and centralizing in a Federal bureaucracy the control of coal mining operations.

### *U. S. Bureau of Mines and U. S. Geological Survey*

We endorse the work of the U. S. Bureau of Mines and U. S. Geological Survey. Their services have been invaluable to the mining industry, and we disapprove any impairment of their functions. Their continued service to the mining industry and contributions to the welfare of the nation are dependent upon their remaining non-partisan and directed by men of unquestioned integrity and scientific ability.

### *Securities and Exchange Commission*

We commend the Securities and Exchange Commission for the steps it has taken looking toward a more rational and understanding treatment of the problems involved in the issuance of mining securities, and urge that the recommendations made by our Committee on Cooperation with the Securities and Exchange Commission be put in full effect.

### *Great Lakes-St. Lawrence Waterway and Power Project*

We oppose as needless and unjustifiable the proposed Great Lakes-St. Lawrence deep waterway and power project. Arguments supporting alleged benefits to the United States from this enterprise are refuted by an analysis of the facts. The enormous ultimate cost, which is not at first apparent would impose large direct and indirect tax burdens; the waterway would be of principal benefit to foreign products and shipping which would invade the most important domestic markets of millions of Americans engaged in agriculture, mining, manufacturing, and rail and water transportation; the water power—being remote from consuming areas—is not now needed, and, if marketed, would displace more economical, steam-generated power.

The project obviously would demoralize, disrupt, and tend to destroy great mining and metallurgical industries and other essential enterprises of the well-integrated economic life in the Great Lakes basin, where successful productive activities of a vast population are vital to the welfare and self-sufficiency of our country.

We endorse the resolution recently introduced in the House of Representatives calling for a complete investigation of this project, and we ask that the State Department suspend its negotiations with the Canadian government pending the outcome of this study.

### *Water Pollution*

We oppose any law or any action placing control of water pollution under any Federal bureau or Federal official. Water pollution is essentially a local problem and can be dealt with effectively and fairly only by the government of each individual state, supplemented if necessary by interstate agreements.

### *Public Land Policy*

We insist on adherence to the present law governing the acquisition of mineral lands on the public domain, which has operated successfully for many generations; namely, by discovery, location, and patent. We are opposed to any proposal to invalidate the established laws relating to mineral locations and to all proposals for the leasing of mineral ground by the Government either in continental United States or in Alaska.

We are in favor of the development of mineral lands within national parks and reservations on the same terms and under the same requirements as prescribed by law for appropriation and use of similar lands on the public domain. We are opposed to the creation of any further public reservations or parks in the United States or Alaska unless the prospecting and mining rights of citizens are preserved and protected.



# The Mining Congress in 1939

● *Report of Julian D. Conover, Secretary, at 42nd Annual Meeting, New York, January 18, 1940*

THE forty-second year of the American Mining Congress has been one of steady progress. Our contacts with mining men and associations throughout the country have been further broadened, and closer and more cordial relationships have been built up in all branches of the industry. Within the entire mining industry there exists today a solidarity which exceeds in its nation-wide strength anything we have known in the past. This was well illustrated in the remarks of no less a person than Senator Key Pittman of Nevada at our Salt Lake City convention—when he congratulated the mining men of the country for standing shoulder to shoulder, not merely as copper men, not merely as gold men, not merely as lead or zinc men, but as members of the great mining industry, united and standing together to protect their common interests.

Contributing to this result have been the work of our committees, comprising hundreds of executives and operating men, dealing with legislative, tax, departmental, operating, and convention problems; the broader distribution of our magazine, bulletins and special releases; the increasing recognition by the public press of mining and its needs; and the numerous local and regional meetings of mining men, climaxing in our national conventions, which enhance good fellowship and permit joint action in determining policies for the entire industry.

Our official publication, the MINING CONGRESS JOURNAL, has continued its steady growth. With circulation now 50 per cent above that of two years ago, its message reaches a constantly wider audience and it is recognized as one of the leading mining publications of the country.

Our Coal Division has enlarged its studies of coal mining problems. Through Committees on Mechanical Loading, Conveyor Mining, Power Distribution, Haulage Roads, Roof Support, Safety, and Surface Preparation, operators and manufacturers are working together to bring about the most

efficient application of modern mechanical aids to low-cost production. A new committee on Stream Clarification has been organized, to present to the industry factual data on proposed methods for reducing acidity of mine waters, and thus assist in averting undesirable legislation on this subject.

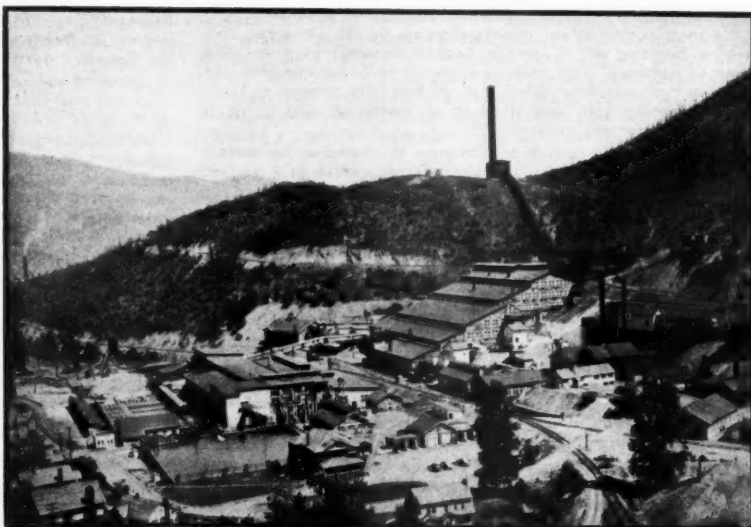
Our Coal Convention in Cincinnati showed an attendance of 3,745. Both operating and national economic problems, including Federal regulation, were considered. At our Metal Mining Convention at Salt Lake City the registration was 2,116. A wide range of problems was debated, and those deliberations have been a potent factor in framing our Declaration of Policy today. The manufacturers of mining equipment, who are equally interested with the operators and miners in the industry's progress, again participated in both conventions with their splendid exhibits.

Throughout our activities, as you know, particular attention is given to the problems of the small mine operators, who constitute a major part of our membership. Close contact is



maintained with the various state associations, especially in the West, which are composed mainly or entirely of small mine operators, and the Mining Congress serves as a clearing house for them in national matters. The combined voice of these thousands of individual mining men, joined in seeking the best interest of the entire mining industry, is a powerful force. We cannot too strongly emphasize the value of active participation in our work by these individual members of the industry throughout the nation.

A special conference of the executives of western mining associations



Zinc plant of Bunker Hill and Sullivan Mining and Concentrating Co. near Kellogg, Idaho

was again held in conjunction with our metal mining convention.

Let us now consider briefly legislation of this past year and prospects in the current session of Congress.

### Reciprocal Trade Agreements

Renewal of the President's Trade Agreement authority is the first and one of the most controversial matters to be decided. Opposition from many quarters is certain and there is a strong demand that any further agreements be subject to Senate ratification.

Outstanding damage to the mining industry was that done to zinc in the Canadian agreement a year ago. In this case the State Department not only violated previous assurances given to Senators and Congressmen from mining states, but departed from the fundamental tenets of its program, in that (1) the duty cut was made following only an incomplete analysis of the facts, and (2) the concession was made to a country which was not the principal source of imports, the primary benefits thus going not to Canada, but to Belgium, Mexico, and certain South American countries from whom no reciprocal concessions were received. In like manner, anthracite and bituminous coal have been seriously affected by the Venezuelan treaty which reduced by 50 per cent the import excise tax on crude oil.

### Finance and Tax Legislation

Government finance and tax legislation is another major subject for this session. Controversy is rife over the President's budget, and there is opposition both to increased expenditures for national defense and to a special tax for this purpose. Congress is caught between the desire to continue heavy relief and farm benefits on the one hand, and the reluctance to vote new taxes or increase the forty-five billion dollar debt limit on the other. The possibility of an "over-riding" tax of 10 to 15 percent, superimposed on present income taxes, has been discussed in administration circles.

Senator Pat Harrison's resolution for a joint committee on the budget, to coordinate action by the appropriations and revenue-raising committees of the two Houses, follows closely the proposal which was first advanced in our resolutions of a year ago, and which was strongly endorsed by Secretary Morgenthau last May. Although not accepted by the House, its possible adoption for future years holds promise of ultimately bringing Federal revenues and expenditures into balance.

The 1939 Revenue Act carried out

in whole or in part many of the principles which the mining industry has consistently urged. The last remnant of the undistributed earnings tax was removed and a flat rate tax imposed on corporate incomes. The right to carry losses forward, and to deduct them from the income of future years, was restored. The provision for re-declarations of capital stock values was amplified, permitting upward revision each year as a protection against excise profits taxes. Capital gain and loss provisions were liberalized to release frozen investment capital. The "last-in, first-out" method of computing inventories, first recognized through our efforts in 1938, was put into workable form. The existing depletion provisions, which have been under repeated attack, were maintained unchanged.

Under the regime of former Under-Secretary of the Treasury John W. Hanes, prospects were good for further removal of tax deterrents to private enterprise and investment, and the

sumed its work, and no action on revenue legislation is expected until after the March 15 returns.

In the application of percentage depletion to mines, new problems are constantly arising. This past year lengthy conferences with Treasury officials were required both to secure proper treatment of lessor-lessee interests, where advance royalties are paid against future production, and to maintain separate deductions for the cost of advance development. Some within the Bureau had contended that such expenses—both advance royalties and advance development costs—should be capitalized and recoverable only as a part of the percentage depletion allowance, rather than as separate deductions.

Last fall a decision of the Supreme Court, in the case of the Wilshire Oil Company, apparently conferred upon the Commissioner of Internal Revenue extremely wide authority to issue regulations governing percentage depletion. This question has been carefully



Mine shops at 500 level of Phelps Dodge Company's United Verde Branch near Jerome, Ariz.

setting up of a sound and reasonably permanent system of income taxation. At our Salt Lake meeting we discussed with Legislative Counsel Thomas Tarleau matters such as the restoration of consolidated returns, the reduction of excessive surtax rates, the elimination of capital stock and excess profits taxes, the more liberal treatment of capital gains and losses, and other needed amendments not covered in the 1939 Act. Prospects for constructive action in the current session, however, have been dimmed by Mr. Hanes' resignation, and by the reluctance of Congress to consider tax revision at this session. The tax subcommittee of the Ways and Means Committee, which met briefly last fall, has not re-

analyzed by our Counsel, Mr. E. C. Alvord, as a basis for consideration with the Treasury when necessary.

A concealed tax provision, contained in the Monetary Bill as passed by the Senate last June, would have assessed domestic producers of silver one-half of the difference between the world price and the statutory price to be paid by the Mint. As interpreted by the Treasury this would have cost the miner approximately 20 cents on each ounce of silver produced—a heavy tax burden on Western metal mines of all kinds. Through our prompt submission of necessary data to Senator Pittman and his energetic action, the conference report was so written as to eliminate this tax.

## Monetary Legislation

Monetary legislation may be another issue before the present Congress. Pending in both Houses are bills to carry out the proposal advanced by the Mining Congress a year ago, to restore the right of private ownership of gold, and to permit the Treasury to pay in gold coin or certificates for new imports of gold. Strong endorsement has recently been given this general plan by the president of one of our largest banks, who emphasizes the importance of putting gold back into circulation as a protection to the world's monetary systems.

Also pending are bills relating to newly mined domestic silver, the unlimited coinage of which was provided on a statutory basis this last year for the first time in over 60 years. Increasing silver demands from India may possibly create a situation similar to that which arose in the last war, which redounded to the benefit of the domestic silver producer.

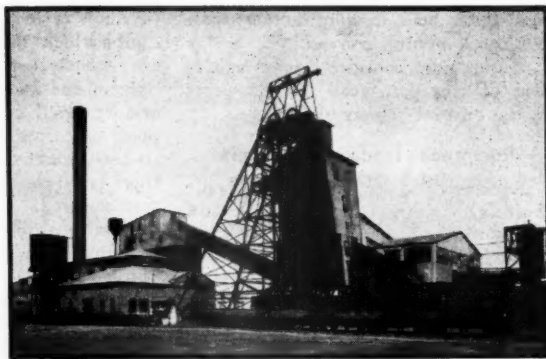
### Wagner Act Amendments

This last year, after four years of experience under the National Labor Relations Act, public resentment over its results finally forced hearings in both Houses of Congress. Nine witnesses for the mining industry, from Alaska, Idaho, Utah, Colorado, Arizona, New Mexico, Texas, and New Jersey, testified as to their experience under the Act, and urged amendments which would protect both employee and employer, encourage true collective bargaining, and foster harmonious industrial relations. This testimony has also been included in the record of the Special House Committee Investigating the Labor Relations Board. Scandalous disclosures by this committee give promise both that the board will be re-constituted and that amendments to the Act will be given serious consideration.

### Wage-Hour Act

The Wage-Hour Act has also been a storm center of criticism. Its application to the mining industry has caused marked dissatisfaction, loss of earnings, higher costs and diminution of reserves. Amendments to permit a longer work-week in non-ferrous mining and milling have received consideration, and one such application to operations "which by reason of high altitude, remoteness from established settlements, climatic conditions, or otherwise, are relatively difficult of access," was reported out last summer

Mine No. 43  
of Peabody  
Coal Co.  
at Harrisburg,  
Ill.



by the House Committee on Labor. Discussion of this matter has resulted in a survey of the mining industry by the Wage-Hour Division, with the progress of which we have kept in close touch.

At the request of placer gold miners in Alaska, Oregon, and other states, we appeared before the Wage-Hour Division, and secured a seasonal exemption for placer operations in Alaska and the more northerly and higher altitude states. This provides the full statutory exemption of 14 weeks, in which a maximum day of 12 hours or week of 56 hours may be worked before payment of overtime. While not adequately meeting the situation it at least recognizes some of the special conditions of mining to which a rigid maximum work-week is not properly applicable.

### Coal Mine Inspection

Federal inspection of coal mines by the Department of the Interior would be required under a bill advocated by Secretary Harold L. Ickes and by John L. Lewis. The Mining Congress led a vigorous opposition to this bill before the Senate Committee last session. Following a mine explosion in Kentucky, the bill was reported, with certain objectionable features removed, and its sponsors have just today succeeded in securing approval by the Senate. This proposal is a serious threat to the cooperative safety work of the United States Bureau of Mines which has accomplished such splendid results in reducing mine accidents. It is moreover an unwarranted invasion of the police powers of the states, and tends to arrogate to the Federal Government the work of the State Mine Inspection Departments. It would be a dangerous precedent which might easily be extended to mines other than coal. Alleged failure of the Bureau of Mines to give active support to the Secretary of the Interior's program, as

evident in this bill, is reported to have been a factor in the recent ousting of the capable and efficient head of that Bureau, Dr. John Wellington Finch.

Amendments to the Guffey Coal Act, which would remove the tax and price-fixing provisions, are also pending. The Mining Congress has consistently been opposed to the principle of Federal control of industry, and the past five years' experience in bituminous coal have convinced most observers that such regulation cannot succeed.

### Stream Pollution and St. Lawrence Waterway

Stream pollution legislation made progress last year. A "survey and planning" bill, providing for cooperation by the Public Health Service with local governments and industries, was passed by the Senate and is now on the House calendar. We have not opposed this bill, but have appeared repeatedly before committees in both Houses in opposition to drastic pollution bills, which would provide bureaucratic Federal control over all deposits of waste in the natural drainage channels. The latter type of measure is being agitated by some of the wild-life organizations, and there is possibility of a serious controversy on the floor of the House.

After having lain dormant for some time, the Great Lakes-St. Lawrence power project and waterway has again been brought to life, and negotiations are now under way between our State Department and the Canadian government. The Administration hopes to have a treaty signed and submitted for ratification at this session. We are cooperating actively in the effort to bring out the true facts concerning this project and to secure its rejection by the Senate.

(Continued on page 73)





# WHEELS of Government

**T**HE first month of the last session of the 76th Congress has run true to form and very much in line with the predictions made by Congressional leaders and observers in December and early January. The fact that 1940 is election year is all important in the striving of the majority leaders for a short session and for the avoidance of issues which will be harmful to the Democratic Party cause during the political campaign. The Departmental and special agency supply bills, deficiency bills and the national defense measures are moving rapidly under obvious pressure from administration sources. The House Appropriations Committee and a goodly majority of the House membership are making heavy cuts in the President's budget recommendations for the various governmental activities, and up to the present time the Senate has been fairly moderate in adding to the amounts approved by the House. It is the announced hope of many that the ever present clamor of the agricultural interests for Federal largess may be satisfied by restoring part of these budget cuts, and that the increased Federal revenues resulting from improved business conditions in 1939 and 1940 will make unnecessary the levying of additional taxes this year.

## Taxation

Early in January Senator Pat Harrison's sound approach to the spending and Federal taxation issues was approved by the Senate when that body adopted a concurrent resolution for the creation of a joint Senate and House committee of 24 members to be composed of six each from the Ways and Means, Finance and the two appropriation committees. While House approval of this resolution has not been obtained, it remains an excellent objective for a future curb on reckless spending, and the consideration given it is evidence of the trend back to sober thinking.

Administration leaders and the revenue-raising Committees are still awaiting the income tax figures to be available shortly after March 15, and until that time there will be no

## ● As Viewed by A. W. Dickinson of the American Mining Congress

further move to originate legislation for additional taxes. This lull in the work of the House Committee on Ways and Means is expected to afford an opportunity for hearings on the bill by Representative Allen of Pennsylvania which would amend the National Bituminous Coal Act (Guffey Act) by striking out the price fixing and taxing provisions and liberalizing the sales agency section of the law. The promulgation of fixed prices for bituminous coal under the Guffey Act still appears to be far in the future. Some observers venture the opinion that it will be most unwise for the administration to arouse the opposition of coal consumers in the present election year. It is further anticipated that the unpopularity of Guffey Act procedure will result in a heavy cut in the 1941 appropriations for Mr. Ickes' Bituminous Coal Division.

## Foreign Trade Agreements

Following the December 21 announcement that copper would not be considered as a commodity subject to negotiation in the pending Chilean foreign trade agreement, the State Department early in January made public the fact that negotiations for trade agreements then under way with Argentina and Uruguay had been suspended. The Department hotly denied the charges of many observers that these actions were taken to reduce opposition to the resolution extending the authority to negotiate and proclaim these treaties which expires June 12. At the Ways and Means Committee hearings on the extension of the authority, Secretary Hull and Undersecretary Grady stoutly defended the treaty procedures and condemned any amendment which would subject trade agreements to Senate ratification, contending that such a requirement would tend to "black out" the work of the whole program to date and would in effect repeal the Act.

Ways and Means Committee member Wesley Disney of Oklahoma announced publicly that he would not support the extension of the reciprocal trade agreements program unless the import excise taxes of the Revenue Act of 1932 on oil, copper, coal and lumber were removed from the jurisdiction of the treaty negotiators. The oil and lumber industries have already suffered deductions in these import excise taxes under the Canadian and Venezuelan trade agreements. George N. Peek, former AAA Administrator and past special advisor to President Roosevelt on foreign trade, described the treaties as making a Santa Claus of the United States. The position of the mining industry was presented to the Committee by Secretary Julian D. Conover, American Mining Congress; Ernest Gent, secretary, American Zinc Institute; Evan Just, secretary, Tri-State Zinc-Lead Ore Producers Assn., and Howard I. Young, of St. Louis, who appeared as Chairman of the Tariff Committee of the National Association of Manufacturers, but who discussed the situation of zinc under the Canadian foreign trade agreement at length in response to questioning by the members of the Committee on Ways and Means.

Mr. Conover specifically asked the Ways and Means Committee, in acting upon the proposed extension of the foreign trade agreement, to:

- (1) Require Senate ratification of all agreements.
- (2) Urge Congress to amend language of the existing law which requires any concession to one country to be extended to practically all nations on the face of the globe, to provide negotiations of trade treaties on a bi-lateral or truly reciprocal basis. If pre-existing most-favored nation treaties make this impossible of immediate action, language should be inserted in the act which will require the President, through the proper agency, to make concessions on any commodity only to that country which constitutes the principal source of imports. This represents nothing more than the announced and oft-repeated policy (unfortunately not

observed in actual practice) of those charged with administering the present act, and should be specifically required by law.

(3) Amend the act to compel corrective action when needed to protect established domestic industries and employment. Suggested by the Mining Congress is an amendment to the present act which would compel the withdrawal of a concession made to any country on a given commodity in the event total imports of that article from other countries exceed those from the signatory country.

(4) Modify the existing Act to take care of the effects of depreciated currencies of other nations and restore the tariff protection which remained when the treaties were promulgated.

(5) Amend the act to make definite provisions for adjusting tariff rates upward as well as downward when demanded by the needs of domestic industry and labor.

### TNEC

At the hearing on the copper industry before the Temporary National Economic Committee beginning on January 15 testimony was given by President Cornelius F. Kelley, Anaconda Copper Mining Co.; President E. T. Stannard, Kennecott Copper Corp., and Chairman F. H. Brownell, American Smelting & Refining Co. Both Mr. Kelley and Mr. Stannard advised the Committee that copper producers should be permitted to work jointly on matters of production, price and other vital problems of the industry free from the fear of punitive action under the anti-trust laws. Mr. Kelley suggested a form of law similar to the Capper-Volstead Act which permits such cooperation among the producers of agricultural commodities. Mr. Stannard stated that the ever-present threat of regulation by the Federal Government should be removed in order that a reasonable stability of business conditions and prices might be attained.

Resumption of testimony on the steel industry before the Committee brought out the fact that the interrelation between prices, costs and demand is such that a reduction in prices does not provide an effective means of increasing production and employment in the industry. Federal Trade Commission witnesses sharply criticized the basing point system, terming it the "negation and frustration" of price competition; but at the conclusion of ten days of hearings TNEC members stated that in their opinion the Federal Trade Commission had not made a convincing case against the basing point system of steel pricing.

### National Labor Relations Board

In January the corrective influence of the Federal courts continued to curb the improper exercise of power by the Labor Board. The Circuit

Court of Appeals in Chicago, in its decision in the Inland Steel case, rebuked the Board for going completely outside its authority in ordering the employing company to sign a written contract with the steel workers union as a part of a collective bargaining agreement. The Court stated that no company is forced to sign a written agreement with any labor organization incorporating the terms reached by collective bargaining.

The Smith Investigating Committee in the House continued to uncover evidence of mal-administration on the part of the Board. One review attorney who was assigned the work of digesting records in the case of the Nevada Consolidated Copper Corporation was found to be an inexperienced boy at a salary of \$1,800 a year, with no experience in the practice of law.

When the Committee granted General Counsel Fahy a week in which to call and examine witnesses he presented Chairman Madden of the Board, who immediately launched an attack upon his fellow Board member, Dr. Wm. M. Leiserson, an experienced arbitrator of industrial disputes who has previously criticized the Board's administration of the law.

The Labor Committees of both Senate and House reopened their hearings to permit CIO representatives to present testimony on the proposed amendments to the Wagner Act. It is still difficult to determine what may be done in the way of amendments this year, but sentiment is strong for the exercise of some administrative or legislative procedure to correct the situation brought about by the Board's mishandling of its work.

In a public statement made by Assistant Attorney General Thurman Arnold, labor leaders were warned that their organizations would be prosecuted under the anti-trust laws where a labor union's strength is used to prohibit use of cheaper materials, where "graft and extortion" are the objectives, where use of technological improvements are deliberately blocked, and where more men than necessary are forced upon an employer. Arnold also said, "The enforcement of the Sherman Act is not a moral crusade, and moral issues and evidence ought to be avoided. It is an attempt to get rid of economic toll-bridges and trade barriers which prevent the competitive distribution of goods."

In passing, it is interesting to note that the work of the Dies Committee investigating subversive activities re-

ceived House approval by a vote of 345 to 21.

### Wage-Hour

Action on the proposed amendments to the Wage-Hour Act has been put aside by the House Committee on Labor until after March 1 in order to give time for Col. Philip Fleming, new directing head of the Wage-Hour Division, to try to work out by corrective procedure some of the difficulties which the amendments seek to correct. The Economics Section of the Wage-Hour Division is now assembling and analyzing the material secured from its survey on the effect of the Wage-Hour Law on non-ferrous metal mining, with a view to presenting statistics and recommendations to the Administrator and to the House Committee on Labor. Completion of this work is now expected to consume another four to six weeks.

### Federal Mine Inspection

The Neely Federal Coal Mine Inspection bill, S. 2420, was passed by the Senate on January 18 and messaged over to the House, where it was referred to the Committee on Mines and Mining. Impetus to the passage of the bill in the Senate was given by a most unfortunate mine explosion in the State of West Virginia resulting in the loss of 91 men, and the proponents of the Neely bill made the unfounded assertion that if it had been enacted at the last session of Congress the West Virginia explosion would not have occurred. In the course of the Senate debate an amendment was offered by Senator Danaher of Connecticut to strike the word "coal" from the bill. This would have empowered the Secretary of the Interior to enter and inspect all mines of all types. An amendment by Senator Pat Harrison of Mississippi would have limited the annual appropriation for the mine inspection work to \$25,000 a year, but this was also lost. There is considerable sentiment in the House and in the House Mines and Mining Committee against the passage of the Neely bill, which is a totally unnecessary duplication of effort, an evasion of the police powers of the sovereign States and a proposal for an unwarranted expenditure of large sums of money.

### Stream Pollution

As the result of a White House conference in which Senator Barkley of Kentucky and Representatives Mansfield of Texas and Spence of Ken-

(Continued on page 72)



# NEWS and VIEWS

## Pennsylvania Anthracite Tonnage Allocation Program

The anthracite tonnage allocation program, recently amended to meet the suggestions made by Governor James, was approved by the Governor January 23.

It is understood that one of the changes concerned the committee which will govern the allocation plan. Originally it had been proposed that this group consist of seven members, three to represent the operators, three to represent the miners, and one to represent the Governor. The amended plan increases the committee to nine members, with three each for the operators and miners, and three to represent the state. All nine are to be appointed by Governor James.

The committee will have the benefit of the Anthracite Producers' Advisory Board—a group of 14 members named in mid-January, seven to represent the old line companies and seven the independents—which held an organization meeting in the offices of the Anthracite Institute in New York, January 26. The committee elected as chairman, F. W. Leamy, senior vice president, Hudson Coal Company, and Louis C. Madeira, III, executive director of the Institute, as secretary. The members of the committee include: W. M. Burrus, Penn Anthracite Colliery Co.; L. R. Close, Lehigh Valley Coal Co.; Gordon C. Cooke, Glen Alden Coal Co.; R. F. Duemler, Cranberry Improvement Co.; C. A. Garner, Jeddo-Highland Coal Co.; William Gohl, Pennsylvania Coal Co.; C. E. Hildum, Coxse Bros. & Co., Inc.; Caleb S. Kenney, Weston Dodson & Co.; F. W. Leamy, Hudson Coal Co.; Louis Pagnotti, Sullivan Trail Coal Co.; James H. Pierce, East Bear Ridge Colliery Co.; James Prendergast, Susquehanna Collieries Co.; J. B. Wariner, Lehigh Navigation Coal Co., and Frank C. Wright, Jr., P. & R. Coal & Iron Co.

This advisory committee will hold weekly meetings and make forecasts of market requirements to the Governor's Anthracite Emergency Committee at Harrisburg. The Governor's Committee, in turn, will transmit to the individual cooperating companies an estimate of the tonnage each of the companies should produce during the current week in order to serve market requirements.

The plan, it is understood, is based on a daily production of about 239,000 tons, although it is reported that the committee in announcing production figures each week would probably give

them in units of 250,000 tons and multiples thereof, such as 500,000 tons, 750,000 tons, etc.

If the company cannot produce its tonnage in any given week owing to factors beyond its control, such as flood, strike, fire, etc., it can make up the deficiency the following week; however, if it falls under its quota because of lack of capacity, no carry-over into the following week will be allowed.

Entirely separate from the allocation program which is aimed to stabilize the anthracite industry, is a program to solve the bootleg problem. In brief, this plan provides: (1) legitimate operators to lease bootleg holes free to independent miners now operating them; (2) operators to purchase the output and prepare coal for sale at company breakers; (3) bootleg miners to pay a royalty to the estate or owners of the land; and (4) bootleg miners to open no new holes. Meanwhile, the companies would endeavor to take back on their payrolls bootleggers who previously had been regular miners.

## Comments on Lead Industry

Among interesting comments made recently on various phases of mineral production and consumption, the following by Mr. Andrew Fletcher, vice president and treasurer of St. Joseph Lead Company, expresses a somewhat original view on the lead industry:

I believe that the competitive position of lead must be improved. Have you ever stopped to consider the rather interesting fact that because of lead's great durability, we really don't sell lead—we only "lease" it, and unfortunately our "leasing" terms are not very satisfactory, because in times of depression lead "leased" for battery, cable covering and similar uses comes back in the market in quantities almost equal to the consumption of virgin lead for these purposes. In times of activity, when people use batteries, install new telephones, and continuously require more of these products, then the miner has difficulty in meeting the demand, with the result that the price rises to the point where other metals and products—on which great amounts of time and money have been spent in research—replace lead. In order to basically improve lead's position, we must encourage its use in industries where it is not "leased" but stays sold, for example in gasoline and paint, because I am frankly not very hopeful of changing our "leasing" terms.

Lead is undoubtedly the best protector for outside, and in many cases inside surfaces, and immediate results for increased consumption in this field are possible. I say "immediate" because the potential market is very great. In accord-

ance with U. S. Government figures, the consumption of paint has more than doubled in the past 18 years (50 million gallons in 1921 and 110 in 1937), but the lead in oil consumption over the same period has been cut in half (20 million gallons in 1921 and only 10 in 1937). If lead was not the best protector, one might be able to understand the extremely unfavorable comparison. I believe that the reason why other paint products have increased so tremendously in use is primarily because of effective advertising and the convenient form in which the finished products have been available to the consumer.

To change the trend, through the Lead Industries Association, the lead miners, smelters and manufacturers expect to spend in an advertising and promotion program about \$1,000,000 over a period of three years—of this budget, approximately \$250,000 will be spent in 1939. I am sure that this expenditure will be mutually advantageous to the suppliers as well as to the consumers, and I hope that if in the future some other constructive program for research, or study, with the view of improving the competitive position of lead is developed, that it will receive the same hearty cooperation on the part of the lead interests.

If we handle our industry "constructively," I am sure the opportunity for greatly improved consumption is possible, because in Great Britain the lead consumption per capita has doubled between 1922 and 1938 (nine pounds in 1922 and 18 in 1938), whereas in the same period in the United States it has decreased about 40 percent, from 10.79 pounds to only 6.15.

## Midwest Power Conference

Armour Institute of Technology, in cooperation with seven Middle Western universities and colleges and several local and national technical societies, is again sponsoring the annual Midwest Power Conference, to be held in Chicago, April 9 and 10, in the Palmer House Hotel, under the direction of Stanton E. Winston, 401 S. Quincy St., Hinsdale, Ill., associate professor of mechanical engineering at the institute, Charles A. Nash, 4715 N. Spaulding Ave., associate professor of electrical engineering at the institute, is secretary of the 1940 conference.

The purpose of the Power Conference has been established as that of offering an opportunity for all persons interested in power production, transmission or consumption to meet together annually for the study of mutual problems free from the restrictions of required memberships in technical or social organizations. The tentative program for the conference includes some 25 important subjects to be discussed by authorities from educational and industrial fields in all parts of the country.



## COAL DIVISION PRICE HEARINGS END

The Bituminous Coal Division of the Department of Interior finished its final hearing for the establishment of minimum prices "at the mine" for bituminous coal throughout the United States on January 20, 1940.

The Presiding Examiners, Thurlow G. Lewis, Division Chief Examiner, Charles O. Fowler, and Louis Jaffee, who conducted the hearing, will now devote their undivided attention to their report. This report, which will contain schedules of what the examiners think the prices should be in light of the testimony in the hearing, will be made public in ample time to permit the filing of exceptions with the director.

Publication of final price schedules recommended by the Division Trial Examiners will follow the hearing of arguments and the filing of briefs by persons who participated in the hearing. This will leave only the hearing of exceptions to the examiners' findings by Director Howard A. Gray, of the Division, and appeals to Secretary Ickes before the final price establishment process is completed, which the Division now hopes to accomplish by early in April.

The established prices will reflect the joint work of several hundred of the industry's elected and appointed representatives, individual coal companies, coal consumers and their representatives, the Consumers' Counsel Division of the Office of the Solicitor, Department of Interior, and the Bituminous Coal Division.

The schedules will include prices for each specific size and grade of coal produced by each of the country's more than 13,000 bituminous coal mines whose operators are subject to the Bituminous Coal Act. The schedules will be grouped regionally.

The hearings which underly the prices are the most extensive of the type any governmental agency ever has conducted into the affairs of an industry. Since early in 1938, first the National Bituminous Coal Commission, and then its successor, The Bituminous Coal Division, has probed into almost every conceivable economic phase of the production and marketing of bituminous coal.

The final hearing, just closed, opened May 19, 1939, at Denver, Colo., for the Far West. It resumed sitting at Washington, D. C., on July 24, 1939, and has been constantly in session on prices for the rest of the country since that date.

The final hearing opened with schedules of prices originally proposed by the National Bituminous Coal Commission, after the District Boards representing the industry who were to have proposed the prices failed to agree on a substantial portion of them. The examiners then began the long process of collecting evidence to ascertain whether the first proposals should stand, or whether and how they should be changed, in light of the evidence, before they were placed in effect. Coal consumers, as well as

the coal producers, responded to a general invitation to tell the examiners what they thought the prices should be.

The Division led off, and with seven expert witnesses explained the proposed prices and gave the examiners their judgment on what the final prices should be in light of their investigations and studies. Nearly 100 witnesses, mostly expert coal men, engineers and chemists, representing District Producers' Boards, offered the examiners testimony on the prices. They were represented by 21 attorneys, many of whom constantly attended the hearing.

The examiners offered individual coal producers opportunity to present their facts independently of the District Boards. From the more than 13,000 producers in the country whose minimum prices will be set by the Division, approximately 150 individual producer witnesses responded with testimony, flanked by 50 attorneys.

Individual consumers were given the same latitude for participation in the hearing as the producers, District Board, and government attorneys were allowed. They were represented by approximately 50 witnesses and 38 attorneys.

Approximately 26,000 pages of testimony have been received in the record during the nearly 1,000 hours actually spent in the hearing sessions

since last July 24. Approximately 1,800 exhibits have been received. A vast amount of the hearing time was spent in cross-examination of witnesses by various persons.

The testimony and exhibits introduced at the hearing cover such matters as the geographical boundaries of market areas which may constitute common consuming market areas for coals from different districts; transportation methods and charges; location of rail-connected mines by groups arranged according to the freight rates applicable to the mines; freight rates applicable from each rail-connected mine to destination points, involving 22 production districts and more than one million freight rates; analytical study to determine the average chemical analytical value of coals produced in the respective districts on a seam, quality and prepared size basis; analytical study of the chemical and physical characteristics on a basis of how much heat is capable of being extracted from coals; the history and movement of the price of railroad locomotive fuel, including both fuel produced and consumed on the railway serving the mine, and coal sold to railroads off the line on which the coal originated.

Distribution of coal through Tidewater ports, and the purpose for which such coal is used; history of movement of coal by river from origin to destination; distribution of coal, by size and volatile character, from Great Lakes docks; competition as between slack sizes of coal moving by Great Lakes and such coal moving all-rail

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into the Northwest territory; study of the distribution of coal moving all-rail into all common consuming markets for all uses (industrial, domestic by-product, etc.); distribution of coal from mine to destination by truck or wagon, and the competitive factors involved; study of base coals of the several districts and the relative market value of such coals at points of delivery in common consuming markets—all these and many similar and related matters were analyzed in detail.

Director Howard A. Gray has ordered a program instituted to complete the establishment of minimum prices for bituminous coal, the perfection of enforcement machinery and the completion of other matters incident to prescribing and administering minimum prices.

While the trial examiners who presided at the final hearing on minimum prices are preparing their recommendations for final prices, the work now will go forward to complete enforcement machinery. Final steps will be taken to register distributors and set the maximum discounts producers may pay them for selling their coal. Marketing rules and regulations already have been promulgated, and will become effective along with the minimum prices when announced.

Outside of the official arguments and filing of papers at the proper time and place, there should be little necessity for representatives of the coal industry to call upon Division officials from the close of the hearing until prices are established. The facts upon which the prices will be based are all contained in the hearing record where the industry had full opportunity to present its views.

Mr. Gray said that during this current period a register would be kept of all visitors to the Division. All persons having business in the Division who wish to expedite the handling of that business are asked to communicate with the director or the heads of the appropriate sections in order that arrangements may be made for taking care of their business as expeditiously as possible.

### Unemployment Compensation Benefits Denied By West Virginia Board

The Board of Review of the West Virginia Department of Unemployment Compensation recently handed down an opinion which sustained the finding of the Trial Examiner in refusing unemployment compensation benefits to 100,000 West Virginia miners, idle from April 1 to May 15, 1939, during negotiations for a new wage scale contract in the Appalachian region.

The mooted point in the issue was whether stoppage of work was due to a labor dispute, thus coming within a provision of the statute which provided for disqualification under those circumstances. Extracts from the Board's opinion are as follows:

"In other words, the question involved is whether or not the stoppage of work, which occurred on the first of April,

was due to a labor dispute. \* \* \* The Board of Review finds, as a matter of fact, that the evidence clearly discloses that operations in the coal mines of West Virginia ceased on the first of April, 1939, and that such operation ceased because there was no longer a contract between the United Mine Workers of America, the recognized bargaining agency for the miners, and the coal operators.

"The Board finds that there was a dispute in that there was a difference between the operators and miners as to the terms and conditions upon which they should continue to work, and that that dispute grew out of a failure of the miners and operators to agree upon a new contract to take the place of the one which had expired on April 1, 1939.

"It has been argued by counsel that the stoppage of work the first of April, 1939, was due to the failure of the operators and miners to enter into a new contract; that this was not a labor dispute; that had the suggestion of the miners to extend the old contract been accepted by the operators, there would have been no cessation of work, all of which the Board admits to be true. However, the failure of the operators to agree with the miners to continue operating under the old contract, and the failure of both parties to agree on a new contract, clearly discloses the fact that there was a difference between the two groups as to how operations should continue, and that difference clearly constitutes a dispute and still further establishes the fact that such difference was a labor dispute."

The Board pointed out the different wording of the statutes of Ohio, Pennsylvania, Maryland and other states, and stated that under the West Virginia law there must be a stoppage of work due

to a labor dispute, irrespective of who caused it.

"We intend no reflection upon the findings of the Pennsylvania authorities," the Board continued, "when we point out that with at most three weeks of benefit at stake those authorities adopted a charitable rather than a judicial interpretation of the facts before them. The same may well be true in Maryland, where the claims of not more than 1,400 claimants were in issue.

"The Board finds that the existence of such a dispute is confirmed by numerous instances in which an attempt to continue work was met with concerted efforts to halt same; that no more serious instances of violence occurred than are related in the evidence in this record is a convincing example of the good sense and law abiding qualities of the whole majority of both workers and employers in this state.

"The Board cannot announce its decision in a case involving so many claimants without pointing out that the administration of a trust fund is here involved. The legislature of this state defined the rights of the beneficiaries of this trust. Neither the Department nor this Board can lawfully enlarge those rights.

"The highest interest of the worker and of the state as well is as much served by the protection of the fund from illegal withdrawals so as to assure its later availability to those entitled thereto under the law. The latter cannot be accomplished without the former and we may well take judicial notice of the fact that such a dispute as this involving more than 100,000 workers would at eight weeks of benefit exhaust the West Virginia unemployment trust fund at its highest figure. The guardians of a trust dare not be generous until they are assured that they may continue to be just."

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## Homestake Yates Shaft Nearing Completion

Work on the headframe and surface plant of the Homestake Mining Company's new Yates shaft, which when completed will replace the Ellison shaft which has been in operation for about 40 years and must now be abandoned because of ground subsidence, is progressing rapidly. The new unit will include the shaft, headframe and crusher building, hoist building, change house, compressor building, carpenter shop, and subsequently a mine office building. (See above cut.)

The new shaft will probably be in operation shortly after the middle of the year. The seven-compartment shaft, 25 ft. by 13 ft. 8 inches inside, includes two large cage compartments, one small runabout cage compartment, two ore skip compartments, a pipe and electrical compartment, and a manway. The shaft is being equipped for an ultimate depth of 5,200 ft. below the collar elevation which is 5,310 ft. For 300 ft. down from the collar the shaft will be finished with reinforced concrete, and below that will be timbered with fir. Eighteen hundred feet of the shaft has now been timbered.

The two large cages for the new shaft will be made of aluminum, with double guides, and each cage will have a capacity of 36 men. The runabout cage, reclaimed from the Ellison shaft, is about half the size of the larger cages, and will be used chiefly for service between levels. Each skip will handle nine tons of ore.

The old push bell system of communication with the hoist engineer will be replaced by the marvels of modern radio. The engineer can speak directly with the cager through a radio signaling device designed by Homestake engineers.

The Yates shaft is now stripped to size in its upper section, and workmen have begun raising from the 3,500. The method is to go in at the bottom at a point where a drift intersects the location of the new shaft and work upward, blasting a 6x8 foot raise. Stripping to full size is then begun at the top of the raise by blasting from the sides of the pilot raise, and allowing the waste rock to fall down. The waste rock at the bottom of the



Looking west at the engine room and partially constructed Yates shaft (right) and Ross hoisting shaft (left) of Homestake Mining Co.

pilot raise is drawn from the chutes into cars and hauled off to refill worked-out stopes.

The headframe and crusher building is a steel structure covered with corrugated iron rising 150 feet above the ground. It required 630 tons of structural steel. Started last June, it is now virtually completed.

All hoisting machinery is on hand, and installation work is well under way. Two Nordberg by-cylindro conical double drum engines are grooved to wind 5,400 feet of 1½-in. cable on a single wrap. Each engine weighs a total of 1,120,000 pounds.

The ore skip dump bins are about 50 feet above the collar of the shaft, and will feed directly into gyratory crushers. The 6-in. discharge from these primary crushers is carried by a short belt conveyor to the cone crushers mounted directly over the ore storage bins, for secondary crushing to 1½-in. size. The ore bin is 20 x 50 x 80-ft. deep of reinforced concrete construction, and has a capacity of 5,300 tons, or about 25 percent more than the average daily output of the mine. Ore will be transported from the bin by tramway in four-ton cars through a timbered tunnel to the South mill.

The change house, yet to be constructed, will be a steel and brick building 60 x 85 feet, consisting of two floors and basement, with accommodations for 644 men. Under construction at the present time is a reinforced concrete compressor building 50 x 150 feet which will replace the Ellison and supplement the Ross plant. Not including this compressor, the Yates plant will be equipped with ap-

proximately 8,000 connected electric horsepower.

A main tunnel, concreted for 20 feet from the opening and the remainder heavily timbered, ties the Yates plant in with the other surface plants, and provides access for drills and all other materials and equipment. Numerous storage rooms are provided off this tunnel. A small elevator has been installed to save the lung-straining climb into the headframe. This facilitates construction work, and after completion of the plant will save time on inspection of sheave wheels, skip-dump, etc.

Installation of hoist machinery recently began, and will require about six months for completion. The headframe and crusher building is practically completed. Everything has been closed in, so that severe winter weather has not interfered with construction or installation of equipment.

## Idle Wauseca Mine Leased By M. A. Hanna Co.

G. M. Cannon, manager for the M. A. Hanna Co., in Iron River, Mich., recently announced that the company has leased the Wauseca mine from the Mineral Mining Company. The Wauseca, located on an 80-acre tract of mineral land in Mineral Hills, has been idle since 1933.

The transaction also included a stockpile of ore amounting to 75,000 tons. It is reported that the Hanna Company has no immediate plans to operate the property.

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## Colorado Mining Association Holds Successful Meeting

Discussions bearing on a wide range of mining problems—from public land policy and high-grading problems to methods of solving dust problems and a survey of national legislation affecting mining—featured the 43rd annual meeting of the Colorado Mining Association and Colorado Chapter of the American Mining Congress, held in Denver, Colo., January 26 and 27. Hundreds of Colorado mining men, and large numbers of prominent leaders from different parts of the country, gathered for the two-day session, which culminated the second night with the world-famous "Sowbelly Dinner," which for many years has been the traditional gathering of the year for Colorado hard rock miners.

The opening session was presided over by Jesse F. McDonald, president of the association, at which delegates heard addresses of welcome by Hon. B. F. Stapleton, mayor of Denver, and R. J. Osenbaugh, president of the Denver Chamber of Commerce. Robert S. Palmer, secretary, gave an account of the activities of the organization during the past year, and Shrive B. Collins, treasurer, reported on the finances.

Addresses on technical and economic subjects pertaining to mining were presented during the morning and afternoon sessions of the two-day program by the following men:

D. D. Potter—Our Changing Public Land Policy and Its Effect on the Future of Mining.

R. G. Wood—Methods of Apprehending Those Who Steal Mining Equipment.

Albert F. Knorp—The Crime of High-grading and Federal Aid in Apprehending Criminals.

R. H. Brannaman—Workmen's Compensation and the Results of Experience Rating for Those Engaged in Metal Mining.

R. S. Dean—Manganese as a Non-ferrous Metal.

G. F. Loughlin—The Geological Survey and Its Relation to the Development of Mining in Colorado.

A. H. Konselman—Mine Valuation. S. J. Stephenson—Western Industry and Its Development.

F. E. Gimlett—Things Detrimental to Mining.

B. M. McMullen—Tax Titles.

Julian D. Conover—Highlights of National Legislation Affecting Mining.

Donald E. Cummings—The Solution of the Dust Problem by the Mining and Milling Industries.

R. R. Knill—Safety Work and Its Application to Mining.

J. B. Read and R. P. Gallagher—Ground Movements and Subsidence.

Baldwin B. Bane—Recent Forms Proposed by the Securities and Exchange Commission for the Registration of Mining Companies and Proposed Exemptions.

Carl M. Loeb, Jr.—Molybdenum in Iron and Steel, with Particular Reference to Its Application in the Mining Industry.

Remarks on mining operations were presented by W. G. Haldane, Russell B. Paul, R. Julius Hall and A. H. Bebee.

Interspersed with the above addresses were motion pictures entitled "Canadian Gravels," "The Operation of the Utah Copper Company," "Methods Used to Successfully Deal with Dust Problems in Canadian Milling Operations," and "Molybdenum." A demonstration was also presented by the Bausch-Lomb Optical Company on Spectrographic Analysis of Ore.

Jesse F. McDonald of Denver was re-elected president of the Association. Other officers are: Merrill E. Shoup of Colorado Springs, Edward Thornton of Summitville, Harry Bishop of Alma and Walter E. Scott of Central City, all vice presidents; Charles Bell of Ouray, treasurer, and Robert S. Palmer, secretary.

Dr. Francis A. Thomson, president of the Montana School of Mines, was the chief speaker at the Silver Banquet on Friday night, while Stefan Sarraça (recently expelled from Poland) delivered the principal address at the "Sowbelly Dinner," with Merrill E. Shoup as toastmaster.

Heading the convention committees were: A. H. Bebee, general chairman; George O. Argall, Denver chairman; Fred A. Brinker, publicity committee chairman; Warren C. Prosser, sowbelly dinner committee chairman; and Gerould A. Sabin, silver banquet committee chairman.

## Sunshine Revamps Ventilation

Sunshine Mining Company has installed at a cost of about \$100,000 an entirely new ventilation system at its mine in the Coeur d'Alene district of Idaho.

The former system was dependent on old stope raises for air passages, which were extremely difficult to maintain. To eliminate this constant source of expense and trouble, and to provide large airways of sufficient area to permit the passage of a large volume of air with minimum friction, a new system involving 3,000 feet of raising and 1,200 feet of crosscutting is now nearing completion, and should be finished by April. These raises will be equipped with steel safety ladders, thus affording a continuous emergency exit from the lower levels.

In order to provide the increased volume of air made possible by the new system, the company has installed at the No. 4 tunnel an Aerodyne 8-60, an eight-bladed, 5-foot diameter fan, equipped with a 50-horsepower motor. Preliminary tests of the fan have produced in excess of 70,000 cubic feet of air per minute, and by increasing the size of the motor and changing the pitch setting of the propellers, the volume can be raised to 100,000 cubic feet per minute.

The company recently opened an important new ore body of exceptionally high-grade tetrahedrite silver-copper ore on the 2,500 foot level,

according to reliable reports. The new vein is in hitherto unproductive territory in the Sunshine vein foot-wall country, and was opened by a crosscut 140 feet in length. This is the second important high-grade discovery made in the silver belt in recent months by deep crosscut work. The other was in the crosscut from the Polaris 2,300 level to the Chester, where two to three feet of galena ore was encountered unexpectedly.

## Automotive Die Castings for 1940

The automotive industry consistently has been the largest single consuming field for zinc alloy die castings. New Jersey Zinc Company reports that there are more die cast parts on the 1940 models than there have been on those of any previous year. Once an automotive part is produced as a zinc alloy die casting, it usually remains so on subsequent models, the company states.

Die castings for radiator grilles attract most widespread attention, and the roster of cars carrying such grilles has steadily increased until in 1940 all but five employ zinc alloy for grille production, newly added makes to the list including Fords, the Mercury, and the Willys. Of the more than 35 lb. of zinc alloy die castings on the 1940 De Luxe Ford, 11 lb. are on the front end alone, of which 6 lb., 11 oz. is carried in the two die cast radiator grilles.

## Coal Analyses Data

National Coal Publications, W. C. MacQuown, owner, recently announced the release of the latest editions in their new series of publications—MacQuown's "Proximate Coal Analyses, District Board Analyses"—covering Districts Eight and Nine.

The data contained in these books is an exact copy of the analyses filed with the National Bituminous Coal Commission by the District Producers Boards. Names of companies and mines have been brought up-to-date, and the name of the seam added.

Separate volumes are now available for Districts 1, 2, 3, 4, 5, 6, 7, 8, and 9. All volumes are listed at \$10 per copy, with the exception of the District 9 edition, which lists at \$5.

Additional volumes will be available in the next few weeks covering Districts 10 to 15, inclusive, and plans are also being made to secure and publish the analyses on Districts 16 to 23, inclusive.

Requests for further information should be addressed to the organization's offices in the Law Bulletin Building, Pittsburgh, Pa.

## Idaho Quicksilver Mine

The Idaho Almaden Mines Company is producing 50 tons of quicksilver ore daily from a new mine opened at Weiser, Idaho, by L. K. Requa, a California mining engineer, in cooperation with a son of Herbert Hoover.

## Wheels of Government

(Continued from page 66)

tucky participated, the Barkley-Mansfield Stream Pollution bill is to be altered to eliminate grants-in-aid and to provide for loans to States, local governments, corporations and individuals from the Reconstruction Finance Corporation at interest rates of 2 percent or 2½ percent. It will be necessary for Chairman Mansfield of the House Committee on Rivers and Harbors to reintroduce the bill, and it is quite possible that he may experience difficulty both within his Committee and on the House floor from representatives of the wild-life societies who are advocating a drastic "control" type of bill, and also from House members who wish to reduce or eliminate the appropriations it provides for State anti-pollution agencies.

### St. Lawrence Waterway

Negotiators on the proposed treaty to provide for the construction of a 27-foot channel from the Great Lakes to the sea with large power generation facilities on the St. Lawrence River have conferred in Ottawa and Washington, and it is quite apparent that the present administration in this country desires to consummate the treaty during the present session of Congress. Canada's approval of such a treaty is complicated by the position of the cities of Quebec and Montreal, neither of which care to lose their present position as seaport terminals only to become "whistling posts" for vessel traffic supplying Great Lake ports. An inquiry at the State Department elicited the response that reports from Canada indicating that a St. Lawrence Waterway treaty would be signed within the near future were "premature."

### Record Cadmium Production

Production and sales of primary metallic cadmium established new high records in 1939, according to figures compiled by the Bureau of Mines. Production amounted to 4,100,000 pounds, compared with 3,753,323 pounds in 1938 and with 3,995,739 pounds in 1937, the previous record year. Sales were 4,800,000 pounds, considerably more than double the 2,191,035 pounds sold in 1938 and about 19 percent above those in 1935, the previous record year. As a result of the excess of sales over production, producers' stocks were depleted in 1939.

In addition to the large domestic production, supplies were augmented by larger receipts of metal from abroad. Imports of cadmium during



A model coal mining community—a portion of the town of Whipple, W. Va., where the New River Company operates one of its many modern mines

the first 11 months of 1939, according to records of the Bureau of Foreign and Domestic Commerce, were 360,820 pounds, compared with 22,582 pounds in 1938 and with 828,535 pounds in 1937. The rate of importation was abnormal in 1936 and 1937 and the total for 1939 was considerably above all other years. In view of the large imports in 1939 it seems unlikely that the heavy exports in 1938 continued into that year. Export figures are not available at this time.

### Cedar Grove Tipple Burned

Fire on January 22 destroyed the tippie of the Cedar Grove Collieries Company at Cedar Grove, W. Va., with a loss estimated by Roger W. Tompkins, president of the company, at \$30,000.

Two men on the tippie when the blaze started at about 12.30 a. m., told Mr. Tompkins that they believed a heating stove in the tippie overturned, but that they could not understand the cause of the stove upsetting.

Two cars of coal were pulled blazing from under the tippie, and taken to Dickinson, where the cars were saved, but the coal lost. Coal in a third car was saved at the mine. Witnesses stated that the dash of a locomotive pulling two blazing cars of coal through the night proved a spectacular sight.

Mr. Tompkins said that the structure would be entirely rebuilt, requiring about 30 days, during which time 130 miners would be out of work.

### Anthracite Institute Reelects Officers

At the annual meeting of the Anthracite Institute, which represents approximately 70 percent of the Pennsylvania anthracite industry, held in New York January 26, the directors re-elected all officers as follows: C. F. Huber, chairman of the board, Glen Alden Coal Company, president; Louis C. Madeira, III, executive director and secretary; Harry R. Stanton, treasurer, and Norman F. Patton, director, Bureau of Information.

The following directors were also elected: W. M. Burrus, president, Penn Anthracite Colliery Co.; C. F.

Huber, chairman of the board, Glen Alden Coal Co.; Major W. W. Inglis, president, Glen Alden Coal Co.; F. W. Leamy, senior vice president, Hudson Coal Co.; David Lloyd, president, Dial Rock and Green Ridge Coal Cos.; James Prendergast, president, Susquehanna Collieries Co.; Gordon C. Cooke, president, D. L. & W. Coal Co.; Harold M. Smyth, president, St. Clair Coal Co.; Ralph E. Taggart, president, P. & R. Coal & Iron Co.; J. B. Wariner, president, Lehigh Navigation Coal Co., and L. R. Close, president, Lehigh Valley Coal Sales Co.

Power lines financed by Rural Electrification Administration are going into service at the rate of about 560 miles each working day, bringing electric service to some 1,600 additional farm families daily. REA reports that since last spring an average construction rate of 450 miles per day has been maintained.

### BOOK REVIEW

PRINCIPLES OF MINERAL DRESSING, by A. M. Gaudin, McGraw-Hill Book Company, New York City, 1939; 554 pages. Price \$5.

The arrival of this book has been anxiously awaited by those that knew of its preparation. Something well done and useful was expected, and it is so. Most of the writing was done in Butte, Mont., and much of the author's experience was gained there and near Salt Lake City, Utah, both great mining and metallurgical states, where he observed, experimented and wrote in the metallurgical schools of each center.

Mineral-dressing is the processing of raw minerals to yield marketable products (and waste) by means that do not destroy the physical and chemical identity of the minerals. Principles of physics and of physical chemistry lie at the root of every individual process employed in mineral dressing. Engineering economics are also involved. Ore-dressing is mineral-dressing applied to ores. Mineral-dressing involves a size-reducing or liberating operation or group of operations as a first step, and a separating operation or group of operations as a second step. Gaudin shows with brief descriptions, 10 flow-sheets of plants for the dressing of gravel, rock, bituminous coal, anthracite, tin ore, gold ore, magnetite ore, phosphate rock,

copper sulphide ore, and a lead-zinc sulphide ore—representative types of minerals. The foregoing items are by way of introduction.

Chapter 2 on crushing or size-reduction describes and shows regular types of crushers—jaw, gyratory, rolls, stamps and several special types such as toothed rolls and hammer crushers. Their effect and product are considered.

Preceding Chapters 5, 6 and 7 on grinding, attributes of comminution, and industrial screening, respectively, is a chapter on laboratory sizing and one on liberation. As the effectiveness of most dressing operations is a function of the size of particles treated, thorough knowledge of the size characteristics of the materials handled is of greatest importance. This requires a good command of laboratory sizing techniques—by screening, elutriation and sedimentation, centrifuging, and use of the microscope.

Pictures and short descriptions of grinding mills follow. This includes the theory of ball-mill operation and energy consumption. (The Hardinge electrical "ear" to regulate the feed is not mentioned.) Ball-mill-classifier circuits are discussed, and some space is allotted to rod-mills, tube-mills, and other machines, even to the ancient process of fire-setting and the recent attempts at steam-shattering of ores.

By "attributes of comminution" is meant the crushing and grinding efficiency, and the shape and size of the particles in the product. The general fracturing habit of each mineral species and their crushing resistance are important to know.

In studying industrial screening, consideration must be given to the type of screening surface and to the type of machine that is employed therewith. A mineral-dressing rule broadly applicable is to use screens for sizing coarser than 20 mesh and classifiers for finer than 35 mesh, with, of course, some exceptions. The mathematics of particle size, and types and characteristics of screens are covered. Although the operating cost of screens is low, their installation cost is fairly high.

Ground ore and water or any solution make pulp, and a chapter is devoted to the movement of solids in fluids, which plays a part in all mineral-dressing processes. This is a technical chapter and is concerned with particle size, velocity, turbulence, sides of vessel, settling rates, and other factors.

Classification (Chapter 9) may be regarded as based principally on Stokes' law of sedimentation. Particles of various sizes, shapes and gravities are separated by being allowed to settle in a fluid. Classifiers of the Richards', Allen, Dorr, Akins types (wet), of the Hardinge type (pneumatic), and of the log-washer and Rheolaveur (coal) trough types are shown and described.

Sink-and-float separation and the use of heavy fluids and those in which sand, galena, barite, magnetite, hematite, pyrite, or ferro-silicon are suspended are described, as applied to coal and zinc-lead ores. (The important and large installation at the Halkyn lead-zinc mine, Wales, is not

mentioned.) In the next chapter on jigging, attention is called to the possible use of heavy suspensions in place of water in jigs.

Jigging has been and is an important method of concentration; it is growing, especially on gold-silver ores, and is suitable for chrome, tin, and other ores. Jigs are primarily coarse-mineral concentrating devices, and remove minerals as soon as they are freed. Their action is described and several makes are illustrated. (As in reviewing another book on metallurgy which considered the jig as losing place in flow-sheets, we disagree with Gaudin's statement on pages 277 and 278 that "in spite of a few notable exceptions, jigs may be regarded as obsolete in plants concentrating minerals of the non-ferrous metals. . .")

At one time, flowing-film concentration of pulp (Chapter 12) was done on a stationary, inclined surface or table. Removal of the heavy particles was intermittent. Then vanners and round tables were used, and now shaking tables. The forces that act in such concentration are explained. As is known, riffled decks are of great importance, and handle a teetering suspension of particles often many particles deep. Several types of tables are described, and tabling costs are around 5 to 10 cents per ton.

Flotation and agglomeration are divided into three parts—physical aspects, chemical aspects, and technology—90 pages in all. The third part covers plant practice. In the first and second parts the principles of flotation and the effect of reagents are fully discussed, with a hundred references to published works. Gaudin, like Oliver Ralston and James Norman, believes that the problem of surface reactivity and of surface condition of minerals is of the greatest importance in flotation. If tarnished surfaces are first cleaned, flotation will be easier.

Chapter 18, Magnetic Separation, is stated on the book jacket to be "the only modern treatment of the subject." (Possibly this is so, although we know of an extensive publication on magnetic separation in the press.) After defining magnetism, Gaudin discusses the theory of separation, then considers the elements in design of separators and the operation of certain types whose principal features are tabulated.

A score of pages comprises a chapter on miscellaneous processes that depend on (1) color and appearance (hand sorting, with a suggestion that the electrical "eye" may be developed for this); (2) heat properties (decrepitation); (3) electrical properties (electrostatic separation); (4) differential hardness (resistance to wear, malleability, and weathering); (5) adhesion to oil (formation of granules and selective adhesion of minerals to grease as in diamond recovery); (6) amalgamation of gold.

The last chapter, Mineral Dressing as an Art, considers economics—capital cost, dressing cost, dressing profit, justification for a plant, ore-testing, and a two-page table on a likely ore-treatment process in relation to ore characteristics to recover the principal and auxiliary valuable constituents.—M. W. von Bernwitz.

## The Mining Congress in 1939

(Continued from page 64)

### Other Legislation

Continuation of the strategic materials program initiated last year is in prospect. This provides \$500,000 per year for work by the Geological Survey and Bureau of Mines, in exploring for and studying the utilization of domestic sources, together with \$100,000,000 over a four-year period for the accumulation of stock piles. Of the latter, \$10,000,000 was appropriated for the current fiscal year, with the purpose of using as much as possible in purchasing from domestic sources, and of stepping up the amount of purchases in subsequent years.

Anti-trust legislation is perennially in the picture. The life of the TNEC or so-called Monopoly Committee as now constituted expires in April. It will probably be extended—in fact, the proposal has been made that the committee be continued as a permanent organization, to investigate and publicize information concerning price increases. The O'Mahoney-Borah bill for Federal licensing of corporations is receiving some attention and may be pushed at this session, but it is generally felt that the O'Mahoney-Hobbs bill, providing civil penalties for officers and directors of corporations violating the anti-trust laws, is too drastic to warrant enactment.

The work of our Committee for Cooperation with the Securities and Exchange Commission has resulted in the creation this past year of a Mining Unit within the SEC, to deal with mining security registrations and applications for exemption. We are also advised that a new and simplified form will soon be available for registration of primary mining ventures, together with improved procedure governing exemptions of security issues not exceeding \$100,000.

Numerous other phases of our work with the National Congress, with the Government Departments, and with members of the mining industry might be mentioned if time were available. We have felt encouraged by the progress made in many of these matters, and particularly by the warm support which the industry has accorded to the work of its national organization. We consider it a privilege to serve the cause of mining, and pledge our best efforts in the coming year.



# PERSONALS



**J. B. Haffner**, general manager of the Consolidated Coppermines Corporation, of Kimberly, Nev., was recently elected a member of the 100,000 Mile Club, an exclusive organization of persons who have flown 100,000 miles or more by commercial airliners.

**Carl F. Keck**, formerly with the Jamison Coal and Coke Company, Greensburg, Pa., has resigned from the Jamison company to accept a position with the Koppers Coal Company as superintendent of the Keystone mine. The Keystone is the second largest producer of tonnage in the Koppers organization, and third largest in the state of West Virginia.

**J. W. McKenna**, who has been chief mine inspector for the Pittsburgh Coal Company during the past several years, has resigned to accept a position in the Pennsylvania State Mining Department. **Rees Nicholas**, formerly assistant chief inspector of the Pittsburgh Coal Company, has been appointed to succeed McKenna.

**Frank B. Shiffler**, mill superintendent of General Electric Company's Germania tungsten mine at Germania, Wash., has been transferred to the company's tungsten property in the Blue Wing district of Lemhi County, Idaho, where diamond drilling is now under way.

**Leverett Davis** was reelected president of the Oregon Mining Association at the January 13 meeting of the board of directors. At the same meeting **D. Ford McCormick** was reelected vice president, and **F. Whalley Watson**, secretary-treasurer. **G. Prescott Lilley** succeeded **L. C. Newlands** on the board of directors, other members of which are **W. H. Cullers**, **R. P. Porter**, and **S. H. Williston**.

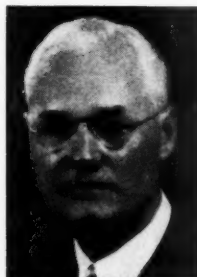
**Andrew Leith** is now back with **Pickands, Mather & Company** in Cleveland, Ohio, after a leave of absence of several months during which he held a visiting professorship in structural geology at Columbia University.

**Frederick M. Feiker** has resigned as executive secretary of the American Engineering Council to become dean of the School of Engineering of George Washington University, succeeding **Dean John R. Lapham**, deceased.

**Newell G. Alford**, of **Eavenson, Alford & Auchmuty** and the **Clover Splint Coal Company**, was elected

president of the Coal Mining Institute of America at the institute's fifty-third annual meeting.

**R. C. Norberg** was recently elected president and general manager of the Electric Storage Battery Company, manufacturers of Exide batteries. He replaces **John R. Williams**, associated with the company for the past 45 years, who announced his retirement as president.



R. C. NORBERG

**Mr. Norberg** has been with the Electric Storage Battery Company as vice president and general manager since January, 1932, previous to which he had held the presidency of the Willard Storage Battery Company.

**H. P. Binder** has been appointed assistant manager of the centrifugal pump division of the **Allis-Chalmers Mfg. Company**.

**T. A. Day**, manager of the southeastern office for **Appalachian Coals, Inc.**, addressed the Rotary Club of Knoxville, Tenn., January 9 on the subject, "Southern High Volatile Bituminous Coal Industry."

**A. C. Eide** has been appointed manager of the pigment division of the **American Zinc, Lead and Smelting Company**, with offices at Columbus, Ohio. Previous to his new appointment, **Mr. Eide** was sales engineer of the **American Zinc Sales Company**. He assumed his new duties January 2.

**R. A. Templeton**, vice president of the **Lincoln-Summitt Coal Company**, is the new president of the **Indiana Coal Mining Institute**. Vice presidents include **H. A. Cross**, general superintendent, **Walter Bledsoe & Co.**; **A. K. Hert**, superintendent, **Snow Hill Coal Corporation**; and **F. M. Schull**, **Binkley Mining Company**. **Harvey Cartwright**, commissioner, **Indiana Coal Operators' Association**, is secretary of the Institute.

Members of the executive board include **David Ingle, Jr.**, **D. W. Jones**, **Birch Brookes**, **H. M. Ferguson**, **Crede Fitzpatrick**, **Peb G. Conrad**, and **H. G. Conrad**.

**Joseph M. Johnson**, chief engineer on the **Marquette Iron Range** for the **Oliver Iron Mining Company**, is the new president of the **Marquette Mining Engineers' Club**.

**Herbert J. Watt** has been appointed manager of sales for the central area of **Carnegie-Illinois Steel Corporation**. **Mr. Watt** will coordinate sales activities of the company's offices at Pittsburgh, Cleveland, Cincinnati, and Detroit. His headquarters will be established at the general offices of the corporation, **Carnegie Building**, Pittsburgh.

**R. E. Howe**, president, **Appalachian Coals, Inc.**, addressed the **Rotary Club** of Knoxville, Tenn., on January 9 on the subject, "Value and Usefulness of Marketing Agencies."

**Evan Just**, secretary of the **Tri-State Zinc and Lead Ore Producers' Association**, is in Washington, D. C., on an extended business trip.

**M. L. Jacobs** has been elected vice president of the **Bethlehem Steel Company**, in charge of raw materials, succeeding **C. A. Buck**, who will continue as vice president and a director, serving in a consulting and advisory capacity.

**Mr. Jacobs**, a graduate of **Lehigh University**, has been with **Bethlehem** since 1916.

**Mr. Buck**, also a **Lehigh** graduate, started with **Bethlehem** in 1887 and became a director in 1914.

## — Obituaries —

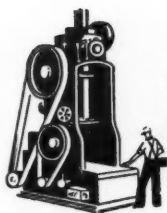
**William C. Hood**, general superintendent of **H. C. Frick Coke Company**, died at Uniontown, Pa., January 22 at the age of 62. After 19 years as assistant general superintendent of the **Frick company**, **Mr. Hood** served as general superintendent of the **United States Coal and Coke Company** until a year ago, when he was elevated to the general superintendency of the **Frick Coke Company**.

**E. W. Allen**, vice president of the **General Electric Company**, died January 1 at **Johns Hopkins Hospital** in Baltimore, Md., where he had been confined two months after an operation.

**Henry G. Dalton**, senior partner of **Pickands, Mather & Co.**, passed away December 27.

**Frank Hunt**, well-known mining geologist of the West and discoverer of the **Rio Tinto copper mine** at Mountain City, Nev., died January 6 in San Diego, Calif., at the age of 76. **Mr. Hunt's** health had been failing since 1932, and he finally succumbed to a heart attack. He had been an outstanding benefactor of the University of Nevada in recent years.

**Colonel Arthur F. Townsend**, chairman of the board, **Raybestos-Manhattan, Inc.**, and general manager of the **Manhattan Rubber Mfg. Division**, died January 14 at Ridgewood, N. J., at the age of 74. He had been suffering with a heart ailment since last April.



# MANUFACTURERS' Forum

## G-E Awards For New Ideas

Employees of the General Electric Company in 1939 received \$63,899 for new ideas adopted under the company suggestion system. This was \$12,497 more than they received in 1938. Cash awards ranged all the way from \$2 to a top of \$525.

During the year, 26,901 suggestions were made by employees which was 6,702 more than in 1938. Of this total, 10,121 were adopted.

In the past 20 years more than \$1,000,000 has been paid to employees for new ideas and better ways to do the job. More than 300,000 suggestions have been made since 1919. In recent years the percentage of adopted suggestions has increased. Awards paid are not fixed, but are determined on estimated savings and other factors such as ingenuity of the suggestors, etc. Awards have been as high as \$1,500.

## John A. Roebling's Sons Company Appoints New General Manager and Sales Manager

Charles G. Williams, formerly vice president in charge of purchasing and manufacturing operations for the 15 plants of the American Chain and Cable Company, Inc., has been appointed general manager of the John A. Roebling's Sons Company, Trenton, N. J.

In January, 1913, Mr. Williams was made purchasing agent of the American Chain and Cable Company plant at Oneida, N. Y. Shortly after the acquisition of the Standard Chain



C. G. WILLIAMS      E. D. EMERSON

Company in 1916, he was appointed general purchasing agent of all plants of the company and was, in 1928, made general production manager. In 1930, he was made a director of

the company, and in 1936 was appointed vice president in charge of all manufacturing operations in the 15 plants of the company.

Mr. William will assume his duties with the John A. Roebling's Sons Company on March 1, 1940.

Edward D. Emerson, since 1937 district sales manager with Babcock & Wilcox Tube Co., New York City, has been appointed general manager of sales for the company, also assuming his new duties on March 1.

Mr. Emerson is a graduate in mechanical engineering, Harvard university, class of 1923. Previous to his employment with Babcock & Wilcox he was for several years sales engineer with the Jones & Laughlin Steel Corporation.

## Foot and Ear Protection

New protection for the feet against nails, spikes, sharp metal projections, and other dangerous underfoot hazards is announced by the Mine Safety Appliances Company in a recent bulletin describing the M. S. A. safety insole.



Built of two layers of overlapping steel strips moulded in rubberized fabric, the safety insole is said to be remarkably light and flexible, bending freely with every movement of the foot, and yet fully capable of preventing injury from penetration of the boot sole by sharp, pointed objects. Full details on this smooth-finished, thin, light, and comfortable new product are contained in M. S. A. Safety Insole Bulletin No. CK-1.

New protection for welders' ears is the subject of the company's Bulletin No. CF-4, entitled "M. S. A. Welders' Ear Protectors." The bulletin illustrates and describes a simple and practical device for preventing injury to the ears caused by entry of flying sparks or hot metal particles, consisting of two ear protectors made of close-woven, nonrusting screen with leather binding, which



are held comfortably in place over the ears by an adjustable spring steel headband. The ear protectors are deeply cupped, ample in size to avoid cramping the ear, and permit complete natural ventilation and hearing. The headband is worn around back of the head, and does not interfere with the wearing of goggles, conventional welding helmets, or any head covering, it is stated. The complete unit is said to weigh only 2 oz.

These bulletins will be sent free on request to this publication, or direct to the manufacturer: Mine Safety Appliances Company, Braddock, Thomas & Meade Streets, Pittsburgh, Pa.

## Hercules Promotions

The Hercules Powder Company announces the appointment of A. E. Forster as assistant general manager of the explosives department. A. R. Ely has been appointed to succeed Mr. Forster as manager of the service division of the explosives department.

Mr. Forster joined Hercules in 1925 as a member of the explosives service division on the west coast. In 1935 he became assistant superintendent of the Carthage, Mo., plant, and assistant manager of Birmingham, Ala., sales office in 1937. Mr. Forster has served as manager of the service division of the explosives department since January, 1939.

Mr. Ely became associated with Hercules explosives operating department at Parlin, N. J., in 1920 and in 1925 joined the explosives sales staff. In 1934 he was appointed assistant superintendent of Bacchus, Utah, explosives plant. Mr. Ely has been a member of the service division of the explosives department since 1937.

Mr. Forster and Mr. Ely will continue to make their headquarters in Wilmington.

Hercules also announces that J. J. Kelleher is again associated with the contractors division of the explosives department. Mr. Kelleher entered the explosives industry in 1915 and has been active in the contractors field for the past 10 years. His selling experience has given Mr. Kelleher a wide acquaintance in the field and a thorough knowledge of contractors' requirements and problems. Mr. Kelleher will make his headquarters in the Wilmington office.

### Lightweight Vibratory Riddle

Universal Vibrating Screen Company, of Racine, Wis., has developed a lightweight vibratory Riddle, trade named "Univibe," weighing but 39 pounds, and operating from any light socket at a cost of one-tenth of a cent per hour at average plant-lighting rates.

This small machine can be held in the hands, operated on a small stand which is adjustable to the desired



operating angle, or it may be aerially suspended by means of convenient studs provided for that purpose at ends of springs and handles.

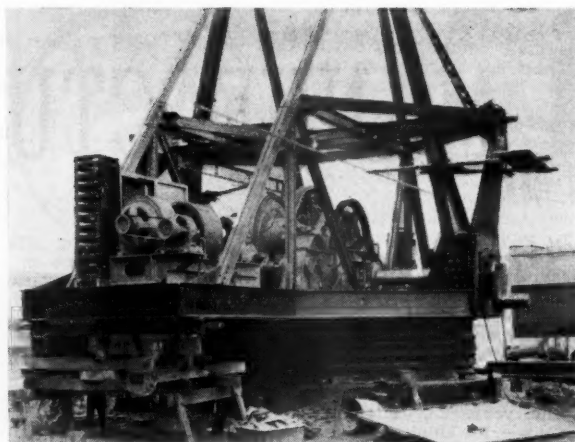
Designed for test purposes, preparation of samples, separation of various materials in cases where it would be impracticable or inconvenient to employ a larger machine, etc. A new principle is employed in keeping the screen mesh clean and free from blinding, augmenting a powerful, vibratory separating action.

Screen sections can be changed in a moment, while the cost of extra panels is as low as 75 cents each.

Information on this new Vibratory Riddle will be furnished by the manufacturers upon request. Just ask for Bulletin No. 77-A.

### Contract to Koppers-Rheolaveur

Koppers-Rheolaveur Company, an affiliate of Koppers Company, has been awarded a contract by the Jones and Laughlin Steel Corporation for the installation of a Koppers-Rheolaveur coal washing plant and ex-



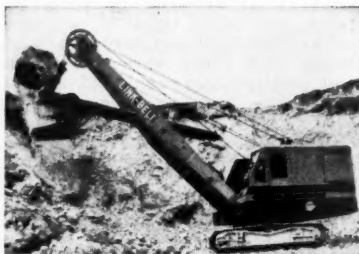
Electric equipment installed by General Electric Co. on new Marion 182-ton walking dragline on a California gold property. The electric equipment for the walking dragline consists of a motor-generator set, composed of a 250-hp. a-c motor driving a 230-volt, shunt-wound generator for supplying power to hoisting motors, a 187½-hp. hoisting motor with a blower for forced ventilation, a 40-hp. rotating motor and various control and auxiliary items. The hoisting generator is rated 165 kw. and the rotating generator 36 kw. Large floodlights are installed to illuminate the pit in front and rear of the dragline, thus facilitating night work.

tensions to the present conveying, crushing, and storage system at its Hazelwood by-product coke plant in Pittsburgh. The installation will have a capacity of 6,000 tons per day. Amount of the contract was not announced. The plant is to be ready for operation within five months.

The company has also been awarded a contract by The American Rolling Mill Company for the installation of a Koppers Battelle launder at its coal mine at Nellis, W. Va. The launder will clean 5/16 by 0 in. coal.

### Link-Belt Speeder Shovel

A newly designed line of Crawler Shovels, 1½ to 2 cubic yard capacity, series "300," equipped with Speed-o-Matic hydraulic (oil) power control and Diesel, gasoline, oil or electric motor drive, is announced by Link-Belt Speeder Corporation, Chicago.



Among the salient features enumerated by the manufacturer are these:

1. New design throughout, giving greater strength, life, stability and efficiency, without the burden of extravagant weight;
2. Greater speed and ease of operation, with the improved Speed-o-Matic control, result-

- ing in 25 percent or more increase in output over manual control;
3. Safe, foolproof control of travel, steering and locking brakes entirely from operator's position in cab, incorporating an automatic locking arrangement against involuntary movement of machine when it is out of travel gear;
4. Increased ground clearance, 14½ inches to 18 inches clear, with travel, steering and locking machinery entirely enclosed, and with no protruding housing and parts to obstruct travel or become damaged or fouled;
5. Choice of crawler width and lengths to suit any practical operating or ground condition;
6. Extreme simplicity throughout, without sacrifice in versatility, including stress-relieved, unit-construction main frames of unusual depth and strength; large, rugged machinery with machine-cut gears throughout, anti-friction bearings and other money-saving features, and
7. Ease of conversion to shovel, dragline, crane or other front-end equipment.

Particular attention is called to the fact that the new line is being announced only after over a year of field tests as a shovel, dragline and crane on tough digging and handling jobs.

Details of construction, working ranges, clearance dimensions and safe loads at the various radii, are given in a new 12-page illustrated catalog which will be sent to any reader upon request addressed to Link-Belt Speeder Corporation, 301 West Pershing Road, Chicago.

### Recent Marion Appointments

The Marion Steam Shovel Company, Marion, Ohio, announces the appointments of the following representatives:

J. Shuman Hower Company, 85 No. Genesee Street, Utica, N. Y., will rep-



resent Marion throughout a large section of central New York State.

P. B. Heis, Pittsburgh, Pa., will work with Harry Cox and John M. Quigley in the Pennsylvania district. Mr. Cox has represented the Marion Steam Shovel Company out of Philadelphia for a good many years, where his headquarters will be retained. John M. Quigley, until recently located at the home office and devoting his time to engineering and sales, is located in Pittsburgh, 1409 Gulf Building. This move was made to extend the Marion Steam Shovel Company sales service in the Pennsylvania region and to augment its activities in the state.

### Spool and Insulated Clevis

Adding to its line of spools and insulated clevises, the Ohio Brass Company, Mansfield, Ohio, has brought out a 3-in. spool and a clevis assembly using this spool insulator. The spool itself is suitable for secondary racks, being the standard size for rack use, and has numerous other applications.



The complete insulated clevis assembly is for dead-ending secondaries and neutral conductors, turning angles, and filling various other requirements. Made of wet-process porcelain, the same as used for high-voltage insulators, the spool has high electrical and mechanical values. It has a tapered hole which distributes loads more evenly and minimizes the possibility of spool breakage should the bolt be deflected under heavy mechanical load. The clevis is made of steel, hot-dip galvanized.

### Oil-Ir-Air-Line Lubricator

Ingersoll-Rand announces a new air-line lubricator—the Oil-Ir—that will operate in any position. Designed primarily for rock-drill lubrication, it can be used on many kinds of air-operated tools. Body construction consists of heavy steel tubing and forgings. Adjustment of the oil feed can be made without taking the pressure off the chamber and without interrupting the work. The lubricator will not “siphon back” or leak when the air pressure is released. It can be filled in either the vertical or horizontal position.

Detailed information on this new air-line lubricator is contained in Form 2600. This folder also contains a discussion of what happens to air-operated tools when they do not receive proper lubrication.

Copies are available from Ingersoll-Rand Company, 11 Broadway, New York City, or from any of their branch offices.



### St. Louis Power Shovel Sells Domestic Business to Goodman

The St. Louis Power Shovel Co. announces the sale of its domestic business to the Goodman Manufacturing Company, of Chicago, Ill. Hereafter any Conway business in the United States, Canada, or Mexico should be referred to Mr. Wm. E. Goodman, president, Goodman Manufacturing Company, 4834 South Halsted Street, Chicago, Ill.

The Corner Shoveling Machine Company has been formed as successor to the St. Louis Power Shovel Co., and will carry on foreign business in Conway machines from 252 Overlook Drive, Greenwich, Conn. The New York office of the Corner Shoveling Machine Co. will be closed, and correspondence should be addressed either to the Corner company at the above address, or to the nearest office of the Goodman Manufacturing Company.

### Sales Manager Appointed

Walter H. Glasgow of Scottsdale, Pa., former official of the H. C. Frick Coke Company and secretary of the Pennsylvania department of mines at Harrisburg during both the Pinchot and Fisher administrations, has been named general sales manager for L. M. Brown, Inc., of Homestead, Pa.

This firm, which is affiliated with Crucible Electric Steel Corp., has just perfected a new self-hardening steel mining machine bit for cutting coal, which is said to be superior to anything now on the market.

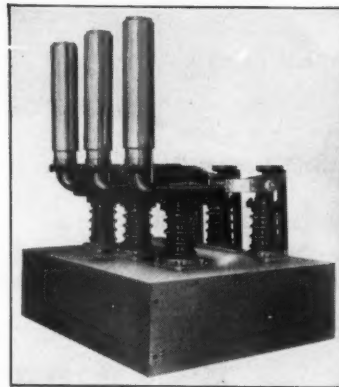
The new mining bits, and special machines for forging them, will be manufactured in Homestead, where Mr. Glasgow will make his headquarters.



### Air Blast Circuit Breaker

A new oilless circuit breaker, which uses the prestored energy of compressed air for the two-fold function of breaker operation and arc interruption, has been announced by Allis-Chalmers Mfg. Company, Milwaukee, Wis.

Designated as type AB-15-500, the new breaker consists essentially of an air storage tank containing compressed air, a main air blast valve, three interrupting chambers mounted



upon hollow insulator supports, three exhaust mufflers or coolers integrally mounted with the interrupting chambers, and isolating contacts connected in series with the interrupting chambers, also mounted on insulator supports. It is rated 600 and 1,200 amperes at 15 KV with 23 KV insulation and interrupting capacity rating of 500,000 Kva.

Special features claimed are as follows: Elimination of oil; short arcing time and fast closing with little or no contact burning and resultant low maintenance; extremely rapid dielectric recovery; power factor correction with elimination of high frequency transients and low rate of rise of recovery voltage; low air consumption; safe, reliable operation; adaptable for panel, cell, cubicle or metal-clad mounting.

### Handbook on Slings

This latest publication by the Macwhyte Company was written specially for use by safety men, superintendents, engineers, purchasing agents, and all others concerned with handling problems (where slings are employed). Containing 56 pages of information, the handbook includes many reference tables and photographs.

Latest information on sling designs, capacity and weight comparisons of slings, wire rope, and chain; tables for safe working loads; typical assemblies; crane signals; breaking strength and weight comparisons—these are typical of the information contained in the handbook.

According to the Macwhyte Company, copies of the new Sling Handbook may be had by simply writing, on company letterhead, giving name and title, to Macwhyte Company, Kenosha, Wis.

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ENGINEERING AND ECONOMIC SURVEYS, ANALYSES AND REPORTS ON POWER APPLICATIONS AND POWER COST PROBLEMS OF THE COAL MINING INDUSTRY

Oliver Building Pittsburgh, Pa.

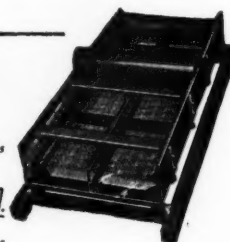
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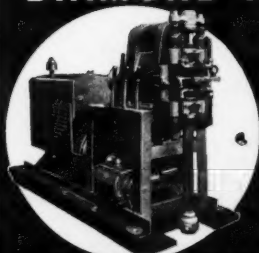
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**Uniform in Service.** Being uniform in quality American Cable's Ropes are naturally uniform in service. When American Cable introduced **TRU-LAY Preformed**, in 1924, we gave all industry a rope that far outlasted ordinary non-preformed, our own make included. Here, too, in increased service, is seen uniformity, for when one **TRU-LAY Preformed** Rope does a job unusually well, the second or twenty-second **TRU-LAY** Rope will do equally well.

**Uniform in Safety.** **TRU-LAY Preformed** is a safer rope. Its crown wires lie flat and in place so that there is less danger of their wickering out and jabbing workmen's hands, which often causes blood-poisoning. **TRU-LAY** handles easier and faster, resists kinking and whipping, spools on drums better and rotates less in sheave grooves. **TRU-LAY** requires no seizing when cut and will not fly apart when broken. Specify American Cable's **TRU-LAY Preformed** for your next line.

**BUY ACCO QUALITY**—whether in American Cable Division's Ropes—American Chains (Weed Tire Chains and Welded or Weldless Chains)—Campbell Abrasive Cutting Machines—Page Wire Fence—Page Welding Wire—Reading-Pratt & Cady Valves—Wright Hoists or any other of the 137 ACCO Quality Products.

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No matter what your requirements — mechanical loading, lump coal, fine coal, rock work, wet work — there is a Hercules permissible that will do the job with maximum safety, efficiency, and economy.

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